

TAXONOMIC STUDIES IN THE MICONIEAE (MELASTOMATACEAE). XII.

REVISION OF *MICONIA* SECT. *MICONIASTRUM*,
WITH EMPHASIS ON THE *MICONIA BICOLOR* COMPLEX

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ABSTRACT

A new section, *Miconia* sect. **Miconiastrum**, is recognized (and includes species previously placed in *Calycogonium*, *Charianthus*, *Miconia*, and *Tetrazygia*). Within this clade, the species of the *Miconia bicolor* complex are revised. For the nine species of the *M. bicolor* complex, descriptions, nomenclatural information (including four new names: **Miconia karsticola**, **M. guajaibonensis**, **M. cajalbanensis**, and **M. maestrensis**), specimen citations, and eco-geographical characterizations are presented, along with an identification key to members of the section. *Miconia* sect. *Miconiastrum* represents a monophyletic group within the Caribbean clade of tribe Miconieae (Melastomataceae) and the group is restricted to southern Florida, the Bahamas, Cuba, and Hispaniola. The clade is characterized by hypanthia strongly constricted in fruit, more or less reduced calyx teeth, obovate to spatulate petals, stamens dropping before the petals abscise, and leaves with globular-stellate to stellate hairs or peltate scales on the abaxial surface. Most species possess mite domatia formed from a dense tuft of elongate, multicellular, barbate, eglandular hairs in the axils of the midvein and major secondary veins, and they have seeds with smooth to slightly bulging testa cells. Within sect. *Miconiastrum* a large subclade, i.e., the *M. bicolor* complex, is diagnosed by 5- or less commonly 6-merous flowers with the petals abaxially papillose-granulose. All members of this clade, except for *M. karsticola*, also possess paniculate-cymose inflorescences of numerous flowers and abaxial leaf surfaces usually densely covered with well-developed stellate hairs or peltate scales. Within the *M. bicolor* complex, indumentum characters (as observed on the abaxial leaf surface), form of the calyx tube, size of the calyx lobes, and presence/absence of mite domatia are taxonomically significant.

RESUMEN

Se reconoce una nueva sección, *Miconia* secc. **Miconiastrum** (que incluye especies previamente conocidas bajo los géneros *Calycogonium*, *Charianthus*, *Miconia*, y *Tetrazygia*), y dentro de este clado se revisa la taxonomía de los miembros del complejo *Miconia bicolor*. Para las nueve especies del complejo *M. bicolor*, presentamos descripciones, información nomenclatural (incluyendo cuatro nombres nuevos: **Miconia karsticola**, **M. guajaibonensis**, **M. cajalbanensis**, y **M. maestrensis**), citas de especímenes, caracterizaciones ecogeográficas y una clave de los miembros de la sección. *Miconia* sect. *Miconiastrum* representa un grupo monofilético dentro del clado caribeño de la tribu Miconieae (Melastomataceae) y el grupo es restringido al sur de la Florida, Las Bahamas, Cuba y La Española. El clado se caracteriza por los hipantos fuertemente constringidos en el fruto, los dientes del cáliz ligeros o extremadamente reducidos, los pétalos de aovados a espatulados, los estambres caducos antes de la abscisión de los pétalos, y las hojas con pelos estrellados, globular-estrellados, o escamas estrelladas peltadas en el envés de la hoja. La mayoría de especies poseen acarodomacios formados por un mechón de pelos alargados, multicelulares, barbados y eglandulares que se presentan en las axilas de la vena primaria con las venas secundarias mayores y también tienen semillas con las células de la testa lisas y ligeramente hinchadas. Dentro de la sect. *Miconiastrum*, un subclado grande, ej. el complejo *M. bicolor*, se distingue por sus flores 5- o menos común 6-meras, con los pétalos abaxialmente papiloso-granulosos. Todos los miembros de este clado, excepto *M. karsticola*, también poseen inflorescencias paniculadas de numerosas flores y el envés de la hoja cubierto por un indumento denso de pelos estrellados, globular-estrellados o escamas peltadas bien desarrolladas. Dentro del complejo *M. bicolor* los caracteres del indumento (del envés de la hoja), la forma del tubo del cáliz, el tamaño de los lóbulos del cáliz, y la presencia o ausencia de acarodomacios tienen un significado taxonómico.

KEY WORDS: *Miconia*, *Tetrazygia*, *Miconia* sect. *Miconiastrum*, Miconieae, Melastomataceae

During the course of work on the systematics and phylogeny of Miconieae (Melastomataceae), we have become aware of a number of taxonomic problems, especially in the species of the Greater Antilles. Recent phylogenetic analyses (Bécquer et al. 2008; Goldenberg et al. 2008; Martin et al. 2008; Michelangeli et al. 2008) showed nearly all of the genera of Miconieae, including *Miconia* Ruiz & Pav., itself, to be highly polyphyletic, a result that is in keeping with the history of problematic generic delimitations within the tribe (Cogniaux 1891; Gleason 1925, 1932, 1958; MacBride 1941; Wurdack 1972, 1980; Judd 1986, 1989; Judd & Skean 1991). Alain (1957), Proctor (1972), and Wurdack and Kral (1982) also have noted the problematic separation of *Tetrazygia* from *Miconia*. As a result, major changes in generic circumscriptions are required. It is clear that nearly all currently recognized genera, many with numerous Caribbean species, e.g., *Calycogonium* DC., *Clidemia* D. Don, *Leandra* Raddi, *Miconia*, *Ossaea* DC., *Pachyanthus* A. Rich., and *Tetrazygia* Rich., are not supported. The most workable solution to this classificatory problem (as clearly evident in Figs. 1–3 of Goldenberg et al. 2008; or Fig. 1 of Michelangeli et al. 2008) is to place most species of Miconieae (including those treated in this paper) within a greatly expanded *Miconia*, comprising the DNA-supported clade within Miconieae that can be diagnosed by the synapomorphy of berry fruits (Goldenberg et al. 2013; Ionta et al. 2012; Ionta & Judd 2012; Majure & Judd 2012) and to conserve the large and megadiverse *Miconia* over the much smaller *Tococa* (Michelangeli, in prep.).

The authors are currently engaged in collaborative research with F.A. Michelangeli, F. Almeda, R. Goldenberg, and G.M. Ionta on the systematics of tribe Miconieae focusing on the systematics and phylogeny of Caribbean members of the tribe. In the course of this research we discovered, based on careful consideration of both molecular and morphological evidence, a distinctive clade that is most diverse in Cuba but also occurs on Hispaniola, Jamaica, the Bahamas, and in southern Florida. The purpose of this paper is to characterize this group of nine species, i.e., the *Miconia bicolor* complex, and to place this clade within the more inclusive clade (comprising ca. 11 species), here characterized morphologically and named *Miconia* sect. *Miconiastrum* (Bonpl. ex Naudin) Judd, Bécquer & Majure.

The monophyly of *Miconia* sect. *Miconiastrum* is supported both by morphology and DNA-sequence data (Goldenberg et al. 2008; Michelangeli et al. 2008, who included in their analyses the species *M. barbata* (Borhidi) Judd, Bécquer & Majure, *M. bicolor* (Mill.) Triana, *M. cajalbanensis* Judd, Bécquer & Majure (as *Tetrazygia coriacea* Urb.), *M. cristalensis* (Borhidi) Judd, Bécquer & Majure, *M. guajaibonensis* Judd, Bécquer & Majure (as *T. lanceolata* Urb.). Additionally, Majure et al. (2014) included the species *M. angustiflora* (Benth.) Naudin (as *T. pallens* (Spreng.) Cogn.), *M. karsticola* Judd, Bécquer, Skean & Majure (as *Calycogonium saxicola* Britton & P. Wilson), of the *M. bicolor* complex, and the basally diverging *M. fadyenii* (Hook.) Judd & Skean (as *T. fadyenii* Hook.) and showed high support for the clade (bootstrap = 96). Michelangeli et al. and Majure et al. (unpubl. data) have also included the two subsequent sister species of the clade, *Miconia delicatula* A. Rich. and *Clidemia swartzii* Griseb., and recovered the clade with high support. Putative synapomorphies of this clade include the constricted hypanthium (in fruit; Figs. 1D, 3E, 6D), more or less reduced calyx teeth (Figs. 1A, B, 3A, D, E, 6A–D), obovate/spathulate petals (Figs. 1, 3, 6), and the stamens dropping before the petals (Figs. 1B, 3A, 6A–C). The flowers range from 4- to 6-merous. Preliminary DNA-based phylogenetic analyses (Michelangeli et al., unpublished) suggest that *Miconia delicatula* (Fig. 1A) is sister to the remaining members of the clade, and the characteristic mite domatia, consisting of a tuft of elongate, multicellular, eglandular, barbate hairs in the axil of the midvein and major secondary veins, likely are synapomorphic for all members of the section (see Figs. 1C, 6A) except for *M. delicatula* (although they have been lost in a few species, e.g., *M. cristalensis* and *M. maestrensis* Judd, Bécquer & Majure; Fig. 6D). All have stellate hairs, although polarities regarding hair form are unclear. The hairs of *M. fadyenii* and *M. karsticola* are quite reduced, while those of *M. delicatula* are large and globular-stellate. Well-developed, usually dense, and more or less flattened, stellate hairs (with arms radiating mainly parallel to the epidermal surface, thus termed “stellate” following nomenclature of Wurdack 1986) or peltate scales (“lepidote” hairs in the terminology of Wurdack 1986) are characteristic of the remaining species. *Miconia fadyenii* likely was the next species to diverge (possibly along with *Clidemia swartzii*), and this putative clade is sister to the *M. bicolor* complex (Michelangeli et al., unpublished analyses).

Miconia fadyenii (Fig. 1B) is especially distinctive because of its adaptations for hummingbird pollination, and for this reason has often been placed in *Charianthus* D. Don (see for example, Proctor 1972), but the close relationship of this species to *M. bicolor* was first noted by Penneys and Judd (2003, 2005). Within sect. *Miconiastrum* the species of the *M. bicolor* complex, here studied in detail, can be diagnosed by their 5- or 6-merous flowers with papillose to granulate petals (either abaxially, or both adaxially and abaxially). This morphologically cohesive subclade is also strongly supported by molecular data (Bécquer et al. 2008; Goldenberg et al. 2008; Michelangeli et al. 2008, and unpublished analyses) and includes *M. angustiflora*, *M. barbata*, *M. bicolor*, *M. cajalbanensis*, *M. cristalensis*, *M. guajaibonensis*, *M. impressa* (Urb.) Judd, Bécquer & Majure, *M. karsticola*, and *M. maestrensis*.

As noted above, *Clidemia swartzii* may also belong in *Miconia* sect. *Miconiastrum*, but this Jamaican endemic, which has axillary, 4-merous flowers and large leaves with numerous elongate, multicellular, eglandular hairs along with minute globular-stellate hairs, has none of the putative morphological synapomorphies of this clade. Its placement in sect. *Miconiastrum*, therefore, requires confirmation through additional DNA samples, as well as analyses including additional species. We note that *M. fadyenii* also is 4-merous, and this character may be a synapomorphy of a hypothesized *C. swartzii* + *M. fadyenii* clade.

Although not included in the DNA-based analysis of Goldenberg et al. (2008) and Michelangeli et al. (2008), the rare Cuban endemic, *Miconia ancistrophora* (C. Wright) Triana, is similar to *M. delicatula* in its deciduous habit, flowers with distinctly clawed petals and stamens often forming two groups, and like *M. delicatula* it may belong in sect. *Miconiastrum*. This hypothesis is supported by several morphological characters: its constricted hypanthium, short calyx teeth, obovate petals, and subulate stamens with a small dorsal pore. We note that its flowers are 4- or 5-merous, the ovaries also 4- or 5-locular, and the seeds somewhat different from those of other species of sect. *Miconiastrum*, i.e., they are 1.3–2.7 mm long and the raphe is broad and deeply sunken (Bécquer, unpublished data). *Miconia ancistrophora* is easily distinguished from all the species here placed in sect. *Miconiastrum* by the bulla-based hairs on its adaxial leaf surfaces. However, definitive placement of this species must await molecular investigation.

Miconia bicolor, the most common and broadly distributed species in the *M. bicolor* complex, was the first to be described, as *Melastoma bicolor* Miller (1768), and this species was transferred to *Tetrazygia* by Cogniaux (1891). The Jamaican species, *M. angustiflora*, was next described, as *Diplochita angustiflora* Benthham (1846), although this taxon long has been known under the misapplied name *Melastoma pallens* Sprengel (1822; transferred to *Tetrazygia pallens* (Spreng.) Cogniaux in 1891). *Miconia maestrensis* was described next, as *Miconiastrum lambertianum* Bonpl. ex Naudin (1850), and occurs in the Sierra Maestra region, Cuba. This taxon was long misunderstood and usually has been considered within synonymy (under either *M. bicolor* or *M. angustiflora*). The Pinar del Río, Cuba, endemic, *Miconia karsticola* was described by Britton and Wilson (1920, as *Calycogonium saxicola*) and placed in *Calycogonium* (instead of *Tetrazygia*) because of its reduced inflorescences and small leaves, which convergently suggested a relationship with species such as *C. glabratum* (Sw.) DC., i.e., the glabrate-domatiate clade (Judd & Skee 1991) within *Calycogonium*. The glabrate-domatiate clade, however, has 4-merous flowers and differently formed domatia, i.e., the hairs are usually non-barbate and connate. Then, in a major paper, Urban (1926) described the narrowly endemic Cuban species *M. guajaibonensis* (as *Tetrazygia lanceolata*), *M. impressa* (in which we include *T. versicolor* Urb. and *T. minor* Urb., also described in the same publication) and *M. cajalbanensis* (as *T. coriacea*). Lastly, Borhidi (1977) described the eastern Cuban endemics *M. cristalensis* (as *T. cristalensis* Borhidi) and *M. barbata* (as *T. barbata* Borhidi).

This brief account clearly demonstrates that these species usually have been treated within *Tetrazygia*; they are considered within this genus in all Antillean or Florida floras (Small 1913; Urban 1920–21; Barker & Dardeau 1930; Moscoso 1943; West & Arnold 1956; Alain 1957; Proctor 1972; Long & Lakela 1978; Correll & Correll 1982; Liogier 2000; Nelson 2011; Wunderlin & Hansen 2011; Michelangeli & Bécquer 2012) except for the phenetically divergent, *M. karsticola*, which has been placed in *Calycogonium* (Alain 1957; Michelangeli & Bécquer 2012). Not only have these species been placed in *Tetrazygia*, many have been confused with the widespread and variable *T. bicolor* (as evidenced by frequently misidentified specimens) and considered to be closely related (Cogniaux 1891; Urban 1926; Proctor 1972).

Within the *M. bicolor* complex, *Miconia karsticola* (Fig. 1C) is probably sister to the remaining species (Michelangeli et al., unpublished analyses). It differs from them in having very reduced inflorescences, smaller leaves, a shorter habit, the much smaller stellate hairs on the abaxial leaf surface, and flowers with a shorter hypanthium and more conspicuous calyx teeth (see key). The remaining species are hypothesized to form a clade, with the putative morphological synapomorphy of leaves with a dense indumentum of stellate hairs (or peltate scales). Among these species, those with an abaxial leaf indumentum of stellate hairs, e.g., *M. angustiflora*, *M. barbata*, *M. cristalensis*, and *M. maestrensis* (Fig. 6A, B, D), are likely early divergent, while *M. bicolor* and *M. guajaibonensis* (Figs. 1D, 3A–D) are presumably derived (and closely related) as suggested by their indumentum of stellate-peltate scales. The scales of these two species may have evolved from stellate hairs through the fusion of the individually radiating arms of the hairs.

Miconia sect. *Miconiastrum* and the *M. bicolor* complex are restricted to the Caribbean region, occurring only on Cuba, Jamaica, Hispaniola, the Bahamas, and in southern Florida. *Miconia* sect. *Miconiastrum* is most diverse in Cuba, which has nine species, eight of these in the *M. bicolor* complex, and all endemic except for *M. bicolor*; itself, which is widespread (occurring on Cuba, Hispaniola, the Bahamas, and in southern Florida; Fig. 4). Jamaica is next with two species, i.e., *M. angustiflora* of the *M. bicolor* complex, and the early divergent *M. fadyenii*, both endemic to the island. Hispaniola, southern Florida, and the Bahamas each contain only a single species, the widespread *M. bicolor*. It is of interest that *M. bicolor* does not occur in Jamaica, which instead has the phenetically similar *M. angustiflora* that has sometimes been considered conspecific. *Miconia bicolor* also is not common in the “Oriente” region of Cuba, where *M. cristalensis*, *M. barbata*, and *M. maestrensis*, all of which also have been confused with *M. bicolor*, are restricted. However, a few problematic collections (including the type of *Tetrazygia acunae* Borhidi) from the provinces of Guantánamo, Holguín and Santiago de Cuba are tentatively placed within this species (see discussion under *M. bicolor*). The region of highest species diversity is the Prov. of Pinar del Río, Cuba, in which five species of the *M. bicolor* complex occur: *M. bicolor*, *M. cajalbanensis*, *M. guajaibonensis*, *M. impressa*, and *M. karsticola* (Figs. 2, 4, 5). All of these, except for *M. bicolor*, are endemic to the province. We note that *M. cajalbanensis*, *M. guajaibonensis*, and *M. karsticola* occur in areas of high endemism (Fig. 5): Pan de Guajaibón, the Cajalbana region, and the Sumidero region, respectively (Borhidi & Muñiz 1986; Borhidi 1991). For information on the vegetation and floristics of the plant communities in which these species occur the reader should consult Alain (1946), Berazaín (1987), Borhidi (1991), Carabia (1945), Borhidi & Muñiz (1986), Seifriz (1943), Smith (1954), and Vásquez et al. (2006) for Cuba; Ciferri (1936), García and Mejía (2008), Hager & Zanoni (1993), Lorenzo et al. (1997), Mejía et al. (2011), and Zanoni et al. (1990) for Hispaniola; Coker (1905), Correll and Correll (1982), Smith et al. (1992), and Nickrent et al. (2008) for the Bahamas; and Alexander (1967), Myers and Ewel (1990), Olmsted et al. (1983), and Phillips (1940) for Florida.

As stated previously, molecular analyses (Majure et al., unpublished data; Michelangeli et al., unpublished data) support the hypothesis that *Miconia delicatula*, an endemic to Pinar del Río, Cuba, is sister to the remaining species of sect. *Miconiastrum*. *Miconia karsticola*, another Pinar del Río endemic, is sister to the remaining species of the *Miconia bicolor* complex. These patterns suggest that sect. *Miconiastrum* originated in western Cuba, where it is still most diverse, and dispersed twice to Jamaica: an early dispersal event leading to *M. fadyenii* (and possibly also *Clidemia swartzii*, if this species actually belongs in the clade) and a later event resulting in *M. angustiflora*, along with other dispersal events to central or eastern Cuba. Some of these dispersal events may have occurred earlier and resulted in *M. cristalensis*, *M. barbata* and probably also *M. maestrensis*, all of the “Oriente” region, and some later, involving *M. bicolor*, which occurs in central Cuba, (especially in Prov. Villa Clara and Sancti Spiritus), and sparingly also in the “Oriente” region (Prov. Guantánamo, Holguín, Santiago de Cuba). Of course, *M. bicolor* also has dispersed to Hispaniola, where the plants are distinctive in having consistently erect, dendritic to globular-stellate hairs or scales on the stems, and also southern Florida and the Bahamas, where the plants have stems covered with more or less appressed stellate-peltate scales.

Chromosome counts are known from only two species, *M. bicolor* and *M. angustiflora*, and these have $n = 17$, which is the most common number in the tribe (Solt & Wurdack 1980).

MEASUREMENTS, TERMINOLOGY, METHODS, AND SPECIES CONCEPTS

Nearly 700 specimens of the *Miconia bicolor* complex (of sect. *Miconiastrum*) were examined for this study. The second author has collected *M. barbata*, *M. bicolor*, *M. cajalbanensis*, *M. cristalensis*, *M. guajaibonensis*, *M. karsticola*, and *M. maestraensis*, while the first and third authors have collected *M. bicolor* and *M. angustiflora* (see specimens examined). Herbaria from which specimens were studied are listed in the Acknowledgments. Abbreviations follow Thiers (2012). Acronyms and citation of collection numbers for Cuban specimens follows Regalado et al. (2010). One hundred and forty-three different characters were measured or observed for each species.

All measurements included in the key and descriptions of species were taken directly from dried material, with the exception of plant height and flower/fruit color, which were taken from information on specimen labels, observed in the field, or in photographs, and floral measurements, which were taken from rehydrated material. Colors of floral structures, placement of petals and stamens, and calyx tube length were all assessed at anthesis. Terminology and measurement of floral parts follow Judd (2007), Judd & Ionta (2013), and Judd et al. (2014).

Species delimitations were based on the morphological-phenetic species concept (Judd 2007) and the diagnostic species concept (Wheeler & Platnick 2000). Finally, the lead researchers in our Planetary Biodiversity Inventory, N.S.F. grant, i.e., Fabian Michelangeli, Frank Almeda, Renato Goldenberg, and Walter Judd, have agreed that it is most appropriate, at this time, to treat these species within an expanded *Miconia*.

TAXONOMIC TREATMENT

Miconia* sect. *Miconiastrum (Bonpl. ex Naudin) Judd, Bécquer, & Majure, comb. nov. *Miconiastrum* Bonpl. ex Naudin, Ann. Sci. Nat., Bot. ser. 3, 15:341. 1850. *Tetrazygia* sect. *Miconiastrum* (Bonpl. ex Naudin) Cogn., in A. de Candolle & C. de Candolle, Monogr. Phan. 7:724. 1891. TYPE: *Miconia maestraensis* Judd, Bécquer, & Majure, basionym *Miconiastrum lambertianum* Bonpl. ex Naudin.

Naudinia A. Rich. in R. de la Sagra, Hist. Phys. Cuba, Pl. Vasc. 10:266. 1846. LECTOTYPE, HERE DESIGNATED: *Naudinia chrysophylla* A. Rich. (= *Miconia bicolor* (Mill.) Triana).

Evergreen or deciduous shrubs; young stems ± rectangular to terete in cross section, lacking longitudinal ridges, the indumentum of moderate to dense, ± ferruginous, dendritic to globular-stellate or stellate hairs, these sometimes very reduced (in *M. fadyenii* and *M. karsticola*), or peltate scales, and rarely also with elongate, eglandular, multicellular hairs (in *M. bicolor* var. *patenti-setulosa*). Leaves ± isophyllous, the blade ovate to obovate or oblong, coriaceous to chartaceous, the apex attenuate to obtuse, the base attenuate, cuneate, or acute to rounded or cordate, the margin entire to undulate; secondary veins 2 pairs, basal, the tertiary veins percurrent, oriented subperpendicular to midvein, connected by quaternary veins, or separated by composite intertertiary veins, the midvein, major secondary veins flat to moderately impressed, tertiary veins flat to slightly impressed on adaxial surface; the midvein strongly raised, the major secondary veins moderately to slightly raised, tertiary and higher order veins slightly raised to flat on abaxial surface; adaxial surface with scattered to abundant druse crystals just below surface, the indumentum initially of globular-stellate or stellate hairs, or stellate-peltate scales, but usually quickly glabrescent; abaxial surface moderately to densely covered with ferruginous to white, or pink, globular-stellate or stellate hairs, these sometimes minute, or with moderate to dense, ± ferruginous stellate-peltate scales; mite domatia consisting of a tuft of elongate, ± barbate, eglandular, multicellular hairs in the junction of midvein and major secondary veins (and occasionally in other vein axils) in most species (but entirely absent in *M. cajalbanensis*, *M. cristalensis*, *M. delicatula*, and *M. maestraensis*). Inflorescences terminal (but also axillary in *M. delicatula*), paniculate cymes of numerous flowers (but reduced to a solitary flower or a 3-flowered cyme in *M. karsticola*), with shoots producing several nodes before becoming reproductive. Flowers 5- or 6-merous (but 4-merous in *M. fadyenii*). Hypanthium terete, constricted above the ovary (at least in fruit), the free portion ± flaring, the outer surface with scattered, globular-stellate or stellate hairs, or peltate scales, an androecial fringe absent. Calyx lobes valvate or open (except in *M. guajaibonensis*,

where imbricate), separate in bud (but \pm fused as a calyptra in *M. impressa*), the tube short, sometimes tearing between the calyx lobes, which are triangular to nearly obsolete; calyx teeth short to obsolete, usually shorter than the calyx lobes (but longer in *M. karsticola*), \pm terete. Petals \pm obovate, slightly to clearly asymmetric, usually spreading (but often \pm erect in *M. fadyenii*), white (but red in *M. fadyenii*) at anthesis, the apex rounded, sometimes slightly asymmetrically notched, the base slightly narrowed to a broad attachment (abruptly narrowed or clawed in *M. delicatula*), the adaxial and abaxial surfaces smooth to granulate, the margin entire. Androecium zygomorphic due to stamens positioned all on one side of flower (most species), in two groups (often in *M. delicatula*), or actinomorphic (in *M. fadyenii*); stamens twice the number of petals, dropping before the petals, isomorphic, geniculate; staminal filament glabrous, but often papillose, anther thecae subulate, straight to curved, opening by a small dorso-terminal pore, at anthesis yellow, without a dorso-basal appendage, the connective not basally projecting (except in *M. fadyenii*). Ovary 3-locular (but 2-locular in *M. fadyenii*), 2/3–4/5-inferior, with conical to cylindrical-conical apex, with a short, slightly ridged collar, but lacking crown, with axile placentation, the ovules numerous, borne on slightly to strongly expanded placenta, style curved distally, stigma punctate to truncate, minutely papillose. Berries globose to ellipsoid, purple-black at maturity. Seeds angular-obovoid, with smooth, \pm rectangular, non-bulging raphe (but broad and deeply sunken in *M. delicatula*), the testa smooth to minutely roughened due to bulging cells; appendage absent.

At this time we can confidently recognize eleven species in this section (although a few specimens from the "Oriente" region of Cuba are only tentatively placed, and more field work may result in the recognition of additional species). All eleven species are included in the following key. However, only the species of the *Miconia bicolor* complex are revised here, and these nine species are numbered in the key. A detailed taxonomic treatment of *Miconia fadyenii* (including description, nomenclature, and specimen citations) has been presented by Penneys and Judd (2003; see also Fig. 1B here). A description (and photograph) of *M. delicatula* can be found in Alain (1957; see also Fig. 1A here).

KEY TO THE SPECIES OF THE *MICONIA BICOLOR* COMPLEX
AND THE RELATED *M. FADYENII* AND *M. DELICATULA*

1. Inflorescences terminal and axillary; plants deciduous, blooming when leaves of the previous season have abscised and new leaves are just flushing out _____ ***Miconia delicatula***
1. Inflorescences exclusively terminal; plants evergreen.
 2. Petals 4, bright red, abaxially smooth, erect to slightly spreading; stamens 8; ovary 2-locular, with placentas deeply intruded _____ ***Miconia fadyenii***
 2. Petals 5 or 6, white, abaxially \pm granulate, spreading; stamens 10 or 12; ovary 3-locular, with placentas shallowly intruded _____ ***Miconia bicolor* complex** [species 1–9]
 3. Leaves 0.8–3.7 cm long; stellate hairs on abaxial leaf surface minute-globular, the hairs 0.02–0.08 mm across; inflorescences of 1–3 flowers; low shrub to 1 m; hypanthium 2.8–3.5 mm long; calyx teeth usually \pm conspicuous, 0.6–3 mm long _____ **1. *Miconia karsticola***
 3. Leaves usually longer than 3 cm; hairs on abaxial leaf surface peltate scales or obviously stellate, the hairs 0.07–0.28 mm across; inflorescences paniculate cymes of numerous flowers; shrub to tree, to 1.5–10 m tall; hypanthium 4.5–8 mm long; calyx teeth usually inconspicuous, 0.1–0.5(–1) mm long.
 4. Hairs on abaxial leaf surface stellate-peltate, i.e., the arms \pm connate (nearly completely to predominantly so) and forming a peltate head.
 5. Calyx lobes imbricate in young bud, unequal, i.e., the 2 outer lobes larger than the rest, and lobes always developed; calyx tube irregularly tearing between lobes; leaves small, the lamina usually less than 8.5 cm long; petals 4.5–6.3 mm long; Pinar del Río, at Pan de Guajaibón _____ **3. *Miconia guajaibonensis***
 5. Calyx lobes valvate or open in young bud, equal, i.e., all \pm the same size, and usually inconspicuous or nearly obsolete; calyx tube not tearing between lobes (rarely with a few irregular tears); leaves larger, the lamina usually more than 8 cm long; petals 5–11.5 mm long; plants of Cuba, U.S.A. (Florida), the Bahamas, and Hispaniola _____ **2. *Miconia bicolor***
 4. Hairs on abaxial leaf surface stellate, i.e., the arms not connate or only slightly so, with longer arms proximally and short to extremely short ones distally.
 6. Leaf domatia present (and formed by elongate, barbed, multicellular, eglandular hairs) at junction of the 2 major secondary veins and the midvein.
 7. Flower buds with a nearly closed, conical calyptra and the petals thus hidden; calyx tube always regularly to irregularly tearing between the lobes; calyx lobes 0.15–0.5 mm wide (but appearing broader due to tearing of the tube); hairs of abaxial leaf surface white to very pale ferruginous; plants of Pinar del Río _____ **4. *Miconia impressa***

7. Flower buds apically open and the petals exposed; calyx tube usually not tearing at maturity, but occasionally with a few tears between lobes; calyx lobes 1.5–3.5 mm wide; hairs of abaxial leaf surface \pm ferruginous; plants of Jamaica or the Oriente region, Cuba.
8. Domatia usually well developed, conspicuous, with elongate hairs densely distributed along 1–11 mm of midvein distal to point where joined by major secondary veins (and sometimes also at junctions with primary and tertiary veins), and all plants with domatia; plants of the central and northern "Oriente" region, i.e., Sierra de Nipe, mountains near Bayate, Monte Verde, and the vicinity of Moa and Baracoa, Cuba
-
8. Domatia not well developed, usually inconspicuous, with elongate, \pm sparse hairs and distributed along 0.25–3(–4) mm of midvein distal to point where joined by major secondary veins, and some plants entirely without domatia; plants of Jamaica _____ **6. *Miconia angustiflora***
6. Leaf domatia absent.
9. Flower buds with a nearly closed, conical calyptre and the petals thus hidden; calyx tube always regularly to irregularly tearing between the lobes; calyx lobes 0.15–0.5 mm wide (but appearing broader due to tearing of the tube); anthers 4.5–5 mm long; hairs of abaxial leaf surface \pm white; plants of Pinar del Rio _____ **4. *Miconia impressa***
9. Flower buds apically open and the petals exposed; calyx tube usually not tearing at maturity; calyx lobes 1–4 mm wide; anthers 4.8–8.3 mm long; hairs of abaxial leaf surface variously ferruginous; plants of Jamaica, Pinar del Rio, or the "Oriente" region of Cuba.
10. Abaxial epidermis of lamina distinctly bullate due to the bulging of individual epidermal cells; testa roughened, with bulging cells; calyx tube 2–3.3 mm long; plants of Pinar del Rio _____ **7. *Miconia cajalbanensis***
10. Abaxial epidermis of lamina \pm smooth; testa smooth to roughened, the cells flat or \pm bulging; calyx tube 0.8–2 mm long; plants of Jamaica or the "Oriente" region of Cuba.
11. Hairs of abaxial leaf surface with arms predominantly radiating outward, parallel with the lamina surface, the hairs sparse to dense, and epidermis often visible; plants of Jamaica _____ **6. *Miconia angustiflora***
11. Hairs of abaxial leaf surface with arms pointing upward to radiating outward, the hairs \pm dense, so epidermis obscured; plants of the Sierra de Cristal and Sierra Maestra, Cuba.
12. Calyx lobes 1.7–3.5 mm long; leaves with tertiary veins raised abaxially; plants of the Sierra de Cristal _____ **8. *Miconia cristalensis***
12. Calyx lobes 0.3–0.6 mm long; leaves with tertiary veins flat to slightly raised abaxially; plants of the Sierra Maestra _____ **9. *Miconia maestrensis***

1. *Miconia karsticola* Judd, Bécquer, Skean, & Majure, nom. nov. (**Fig. 1C**). *Calyconium saxicola* Britton & P. Wilson, Mem. Torrey Bot. Club 16:91. 1920, non *M. saxicola* Brandegee, Zoe 5:215. 1905. TYPE: CUBA, Prov. Pinar del Rio: S of Sumidero, Sierra Caliente, 15, 18 Aug 1915, fl., J.A. Shafer 13770 (HOLOTYPE: NY!; ISOTYPES: A on-line image #00072013!, CAS on-line image #00024271!, NY!, US!).

Evergreen **shrub** up to 1 m. Young **stems** terete to slightly quadrangular, the indumentum of moderate, ferruginous, globular-stellate hairs, without elongate, multicellular, non-glandular hairs, internodes 0.5–3 cm long, lacking longitudinal ridges, nodal line absent. **Leaves** isophyllous or nearly so; petiole 0.3–2 cm long, the indumentum of moderate, minute, ferruginous, globular-stellate hairs; the blade 0.8–3.7 \times 0.35–2 cm, ovate to elliptic or obovate, thinly coriaceous, the apex acute to obtuse or shortly acuminate, the base cuneate or obtuse to rounded, the margin plane, entire; secondary veins a single pair, conspicuous to inconspicuous, acrodromous, \pm basal, the pair joining midvein at base to 1.5 mm above the leaf base, the secondary veins placed 0.5–3.5 mm in from margin, tertiary veins percurrent, oriented subperpendicular to midvein, 1–4.5 mm apart, obscure, the higher order veins also obscure, the midvein and secondary veins slightly impressed to flat, tertiary and higher order veins flat on adaxial surface; the midvein slightly to moderately raised, the secondary veins slightly raised to flat, the tertiary and higher order veins flat on abaxial surface; adaxial surface appearing slightly wrinkled after drying, with scattered druse crystals, and drying only slightly darker than the abaxial surface, the indumentum initially of scattered, ferruginous, minute, globular-stellate hairs, but very quickly glabrescent; abaxial surface pale green, the surface smooth, with moderately scattered, ferruginous, globular-stellate hairs, 0.02–0.08 mm across (appearing under low magnification as punctations), the veins with similar hairs, such hairs on lamina and veins persistent; mite domatia in axils of midvein and secondary veins, consisting of elongate, eglandular, smooth to slightly barbate, \pm ferruginous hairs, 0.1–0.5 mm long (often associated with a distinct depression in the leaf surface). **Inflorescences** terminal, a 1–3-flowered cyme, 1.3–3 cm long, 0.8–2 cm across, with no major branch pairs, the peduncle 0.4–1.7 cm long, the ultimate axes (pseudopedicels) 1.5–6 mm long, and flowers (when more than one present) well separated from each other; bracts 1.5–1.8 \times 0.15–0.2 mm, narrowly triangular, with acute apex, deciduous; bracteoles 0.4–1 \times 0.1–0.15 mm, narrowly

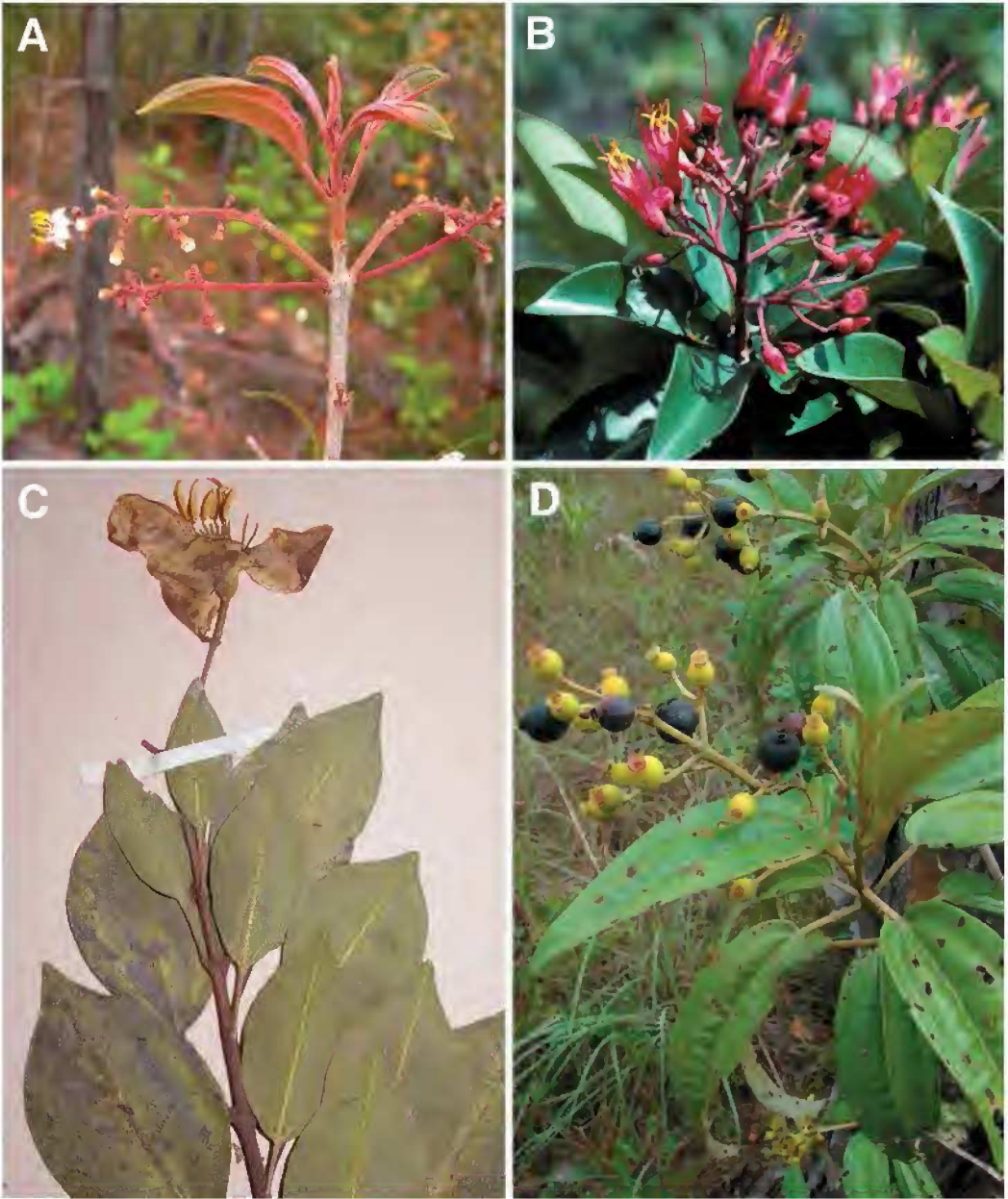


FIG. 1. **A.** *Miconia delicatula* (Bécquer & Abbott 82421). **B.** *M. fadyenii* (Judd 5300). **C.** *M. karsticola* (Ekman 18182). **D.** *M. bicolor* (fruiting plant, from Long Pine Key, Everglades National Park, Miami-Dade Co., Florida).

triangular, with acute apex, \pm deciduous. **Flowers** 5-merous, zygomorphic (due to positioning of the stamens), with pedicel 1.4–4 mm long. **Hypanthium** 2.8–3.5 mm long, terete and slightly flaring, not constricted above ovary, the free portion 1.5–1.7 mm long, 2.5–3 mm wide at the torus, the outer surface with sparse to moderate, minute, globular-stellate hairs, the internal surface \pm smooth, glabrous. **Calyx** lobes 5, separate in bud, the tube 1–1.5 mm long, not or sometimes slightly tearing between lobes, with sparse minute, globular-stellate hairs

abaxially, and glabrous adaxially, the lobes 0.2–0.4 × 1.5–3 mm, broadly triangular to nearly obsolete, the apex obtuse to rounded, with hairs similar to those of the tube but more sparsely distributed, green to red-tinged; calyx teeth present, 0.6–3 mm long, ± triangular to conic-terete, green to red, with acute apex, and hairs similar to those of calyx. **Petals** 5, 7–10 × 5–6.5 mm, asymmetrically obovate, spreading, white, glabrous but abaxial surface densely papillose-granulate, the apex rounded, sometimes slightly notched, the base slightly narrowed to a broad attachment, the margin entire. **Stamens** 10, isomorphic, ± geniculate near filament apex; staminal filament 4.7–5.3 mm long, glabrous, pale yellow, anther thecae 4.3–4.7 × ca. 1 mm, subulate, straight to slightly incurved, opening by a small dorso-apical pore, yellow, the connective not prolonged below the thecae, glabrous, but the filament emerging from slight depression in sterile, minutely dorso-lobed anther base. **Ovary** 3-locular, 1/2–2/3 inferior, globose to shortly ovoid, 2.5–3 mm long, 1.4–2.5 mm in diameter, apically conical to cylindrical-conical, glabrous, the apex with small, ridged collar but lacking crown, with axile placentation, the ovules numerous, borne on small placenta; style 7–9.5 mm long, distally curved, white, glabrous; stigma punctate, minutely papillose, 0.1–0.2 mm wide. **Berries** 4–9 mm long, 4.5–9 mm in diameter, subglobose, purple-black, with scattered, minute, globular-stellate hairs, the hypanthium constricted, 2.5–3.3 mm wide at narrowest point and 2.5–3.7 mm wide at torus. **Seeds** 1–1.6 mm long, angular-obovoid, with ± rectangular raphe, the testa ± smooth; appendage absent.

Phenology.—This poorly collected species is only known in flower from May, August and November.

Distribution and habitat.—*Miconia karsticola* is endemic to the vicinity of Sumidero in Pinar del Río, Cuba (Fig. 2), occurring in rocky areas and cliffs, at ca. 70 m, on limestone.

Additional specimens examined: **CUBA. Prov. Pinar del Río:** Minas de Matahambre, Sumidero, Cueva del Resolladero en el valle de Pica Pica, 19 May 1984, *Alvarez et al.* HFC-54676 (HAJB); Minas de Matahambre, Salón de los Gigantes, cerca del resollarero del río Sumidero, 70 m, 4 Apr 2008, *Bécquer et al.* HFC-85175 (HAJB); Minas de Matahambre, Sumidero, Valle de Pica Pica, alrededores de Cueva Clara, 18 Nov 1978, *Bisse et al.* HFC-38804 (HAJB); Sumidero, in Sierra Caliente, 24 Nov 1923, *Ekman 18182* (S, US); Loma Arenales, S of Sumidero, 20 Aug 1912, *Shafer 13797* (US); Paredón calizo de sombra, a la entrada de la Cueva de los Gigantes, Sumidero, 18 May 1991, *Urquiola et al.* HPR-7569 (HAJB).

Miconia karsticola is easily distinguished from the other members of *M. bicolor* complex (within *Miconia* sect. *Miconiastrum*) by the characters presented in the key. It is especially distinctive because of its reduced inflorescences, flowers with short hypanthia, and small leaves, and these characters led to its being treated within the variable and polyphyletic genus *Calycogonium*. However, its constricted hypanthium/calyx in fruit, the leaves with mite domatia formed by clustered elongate, multicellular, eglandular, at least sometimes barbate hairs in the axils of the midvein and major secondary veins, five-merous flowers with 3-loculate gynoecea, abaxially granulate petals and seed features argue for a relationship with *Miconia bicolor* and its close relatives (in sect. *Miconiastrum*). A phylogenetic relationship with *M. bicolor* and relatives also is supported by DNA sequence data (Michelangeli et al., unpublished data).

The new name, *M. karsticola*, is required because the epithet “saxicola” is already occupied in *Miconia* (i.e., *M. saxicola* Brandegee, a Mexican species). The epithet “karsticola” refers to the floristically diverse, karstic habitat of this species and also echoes the original specific epithet. The flora in the vicinity of Sumidero, in the Sierra de los Organos, is an important center of speciation, possessing ten local endemics (Borhidi & Muñiz 1986; Borhidi 1991). This species is considered vulnerable (VU) by Borhidi and Muñiz (1983) and included in this category in the Red List of Cuban Flora (Berazaín et al. 2005) due to its limited geographical range.

2. *Miconia bicolor* (Mill.) Triana, Trans. Linn. Soc. London 28:103. 1872.

Evergreen **shrub or tree** to 10 m. Young **stems** terete to slightly quadrangular, the indumentum of moderate to dense, ± ferruginous, peltate scales, or globular-stellate to dendritic hairs, these persistent to ± deciduous and stems then glabrescent, with or without elongate, multicellular, non-glandular hairs, internodes 0.8–8.5 cm long, lacking longitudinal ridges, nodal line present, faint to well-developed transverse ridge. **Leaves** isophyllous or nearly so; petiole 1.2–4.7 cm long, the indumentum of dense, peltate scales, but sometimes glabrescent; the blade 5–21.2 × 1.4–6.6 cm, ovate to elliptic or oblong, coriaceous to thinly coriaceous, the apex acuminate to attenuate, the base obtuse to rounded or very slightly cordate, the margin plane to slightly revolute, entire to

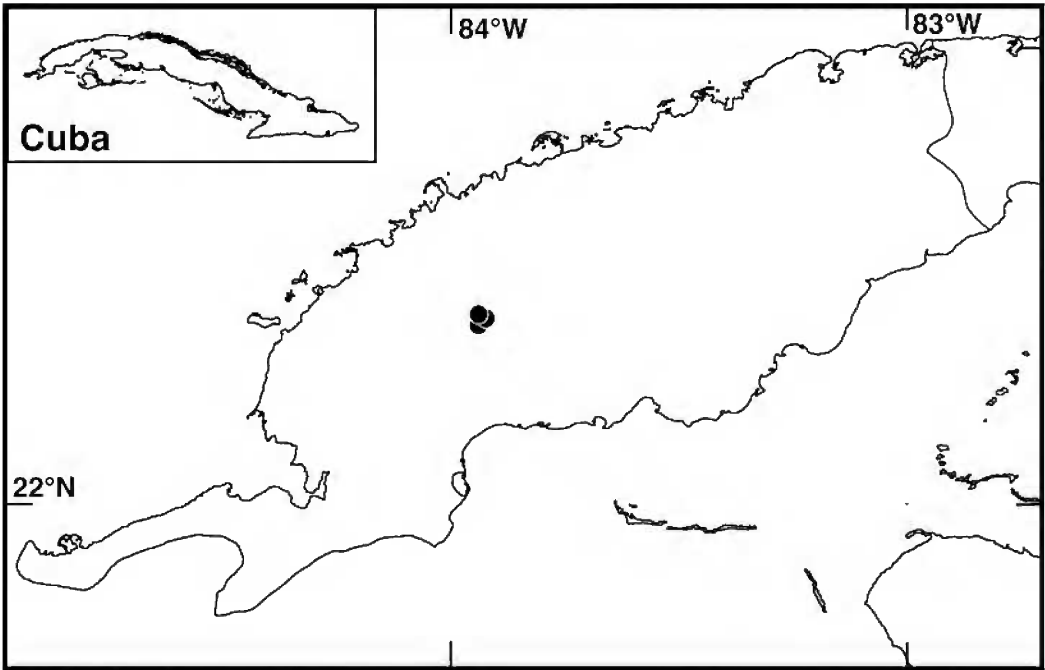


FIG. 2. Distribution of *Miconia karsticola* in Western Cuba.

slightly undulate; secondary veins 2 pairs, one pair conspicuous and one pair inconspicuous, acrodromous, basal or suprabasal, the innermost pair joining midvein at base to 15 mm above the leaf base, the conspicuous secondary veins placed 1.5–12 mm in from margin, the inconspicuous secondary veins intramarginal to 1.8 mm in from margin, tertiary veins percurrent, oriented subperpendicular to midvein, 2–12 mm apart, connected by 1–3 quaternary veins, which are \pm reticulate, or not connected by quaternary veins, and separated by composite inter-tertiary vein, the higher order veins reticulate, the midvein and major secondary veins flat to slightly impressed, tertiary veins flat to slightly impressed, remaining veins flat on adaxial surface; the midvein strongly raised, the major secondary veins moderately to slightly raised, the minor secondary veins and tertiary veins slightly raised to flat, and the higher order veins flat on abaxial surface; adaxial surface appearing slightly wrinkled or punctate after drying, with scattered druse crystals, and drying darker than the abaxial surface or sometimes with a distinctive yellowish color when dried, the indumentum initially of dense, pale ferruginous to translucent, stellate-peltate scales, but quickly glabrescent, although often with a few hairs proximally on midvein, or occasionally even scattered on the surface; abaxial surface pale green but ferruginous to white due to indumentum, the epidermal surface smooth, with dense ferruginous to white, or translucent, stellate-peltate scales, 0.13–0.28 mm across, the veins with similar scales, such scales on lamina persistent to \pm deciduous, and persistent to deciduous on the primary to tertiary veins, and lamina surface occasionally sticky; mite domatia present or absent, usually (when present) at junction of midvein and major secondary veins, but sometimes also at junction of midvein and minor secondary veins, junction of tertiary veins and midvein, and/or junction of tertiary veins and major secondary veins, composed of elongate, multicellular, \pm ferruginous, yellow to reddish, eglandular, barbate hairs, 0.2–1.6 mm long. **Inflorescences** terminal, paniculate cymes, 3.5–19 cm long, 2–13.5 cm across, with (1–) 2–6 major branch pairs, the peduncle 1–6.7 cm long, the ultimate axes (pseudopedicels) 1.5–7 mm long, and the numerous flowers well separated from each other; bracts 0.3–8.5 \times 0.15–1 mm, triangular or narrowly triangular to linear, with acute to rounded apex, quickly deciduous; bracteoles 0.3–0.6 \times 0.15–0.3 mm, narrowly triangular, with acute apex, deciduous. **Flowers** 5- or

less commonly 6-merous, zygomorphic (due to positioning of the stamens), with pedicel 1–3 mm long. **Hypanthium** 3.7–7.5 mm long, terete and moderately to not at all constricted above ovary, the free portion 2–4 mm long, 2–3.5 mm wide at the torus, the outer surface with sparse to dense stellate-peltate scales (and sometimes sticky), the internal surface smooth to very slightly longitudinally ridged, glabrous. **Calyx** lobes 5 or 6, separate (and valvate or open) in bud, the tube 0.5–2 mm long, not tearing between lobes (but rarely with a few irregular tears), with moderate to dense stellate-peltate scales abaxially, and sparse to moderate branched to stellate-peltate scales adaxially, the lobes obsolete or 0.1–1 × 1.5–3 mm, obsolete (with a rim-like calyx) or obscurely to clearly developed, ± broadly triangular to triangular, the apex rounded to obtuse or acute, with hairs similar to those of the tube, green, but often red-tinged or red; calyx teeth absent or present, 0–0.3 mm long, round or ellipsoidal bump (near apex of lobes), green, often red-tinged or red, with rounded to acute apex, and hairs similar to those of calyx. **Petals** 5 or 6, 5–11.5 × 2.7–6.7 mm, asymmetrically obovate, spreading, white, occasionally red-tinged, glabrous but both surfaces densely papillose-granulate, the apex rounded, ± shallowly notched, the base slightly narrowed to a broad attachment, the margin entire. **Stamens** 10 or 12, isomorphic, ± geniculate near filament apex; staminal filament 4–8 mm long, glabrous, pale yellow, occasionally pink-tinged, anther thecae 4.5–7.3 × 0.8–1.5 mm, subulate, straight to slightly incurved, opening by a small dorso-apical pore, yellow, the connective not prolonged below the thecae, glabrous, but the filament emerging from slight depression in sterile, minutely dorso-lobed anther base. **Ovary** 3-locular, 2/3–4/5 inferior, ellipsoidal to oblong or ovoid, 3–5 mm long, 1.5–4 mm in diameter, apically cylindrical-conical, glabrous, the apex with short, slightly ridged collar but lacking crown, with axile placentation, the ovules numerous, borne on slightly expanded placenta that extends only slightly into locule; style 8–18 mm long, distally curved, white to rose, glabrous; stigma punctate, minutely papillose, ca. 0.15 mm wide. **Berries** 5–14 mm long, 4–14 mm in diameter, globose to ellipsoid, purple-black, with scattered stellate-peltate scales hairs, the hypanthium constricted, 1.5–2.3 mm wide at narrowest point and 2–3.5 mm wide at torus, but appearing strongly constricted due to flaring calyx tube. **Seeds** 1–1.9 mm long, angular-obovoid, with ± rectangular raphe, the testa completely smooth, or smooth on flattened distal surface, and ± slightly roughened on the sides, due to slightly bulging cells; appendage absent.

1. Stems and inflorescence axes without elongate, eglandular hairs _____ var. **bicolor**
 1. Stems and inflorescence axes with elongate, eglandular hairs _____ var. **patenti-setulosa**

2a. *Miconia bicolor* (Mill.) Triana var. **bicolor**, Trans. Linn. Soc. London 28:103. 1872. (**Figs. 1D, 3A, B**). *Melastoma bicolor* Mill., Gard. Dict., ed. 8, no. 6. 1768. *Tetrazygia bicolor* (Mill.) Cogn. in A. de Candolle & C. de Candolle, Monogr. Phan. 7:724. 1891. TYPE: Loc. Natalis [country unknown], *P. Miller* s.n. (LECTOTYPE, designated here, following the suggestion of W.T. Gillis, annotation on sheet, 19 Jun 1973, BM, on-line image #001008022!).

Melastoma pallens Spreng., Neue Entdeck. Pflanzenk. 3:62. 1822. *Miconia pallens* (Spreng.) Triana, Trans. Linn. Soc. London 28:103. 1872. *Tetrazygia pallens* (Spreng.) Cogn. in A. de Candolle & C. de Candolle, Monogr. Phan. 7:724. 1891. TYPE: Hispaniola (not seen).

Naudinia argyrophylla A. Rich. in R. de la Sagra, Hist. Phys. Cuba, Pl. Vasc. 10:265. 1845. *Tetrazygia angustiflora* (Benth.) Griseb. var. *argyrophylla* (A. Rich.) Griseb., Fl. Brit. W.I.: 254. 1860. *Miconia angustiflora* (Benth.) Griseb. var. *argyrophylla* (A. Rich.) M. Gómez, Dicc. Bot. Nombres Vulg. Cub. Puerto-Riquenos: 42. 1889. *Tetrazygia argyrophylla* (A. Rich.) Millsp., Publ. Field Columbian Mus., Bot. Ser., 1(6):431. 1900. TYPE: CUBA [PROV. PINAR DEL RÍO]: Vuelta de Abajo, J.M. Valenzuelas s.n. (P?, not seen, and if lost could be typified by t. 44(1) in de la Sagra, 1850).

Naudinia chrysophylla A. Rich. in R. de la Sagra, Hist. Phys. Cuba, Pl. Vasc. 10:266. 1845. TYPE: CUBA [PROV. PINAR DEL RÍO]: Vuelta de Abajo, in locis altis montium (P?, not seen).

Tetrazygia acunae Borhidi, Acta Bot. Acad. Sci. Hung. 23:38. 1977 [1978]. TYPE: CUBA. PROV. ORIENTE [PROV. SANTIAGO DE CUBA]: Sierra Maestra, Pico Turquino, Jul 1936, fr. J. Acuña 19452 (HOLOTYPE: HAC!), non *Miconia acunae* Borhidi, Növényrendsz. Novényföldr. Tansz. Eötvös Loránd Tudományegyet. Budapest 4:23. 1976.

Stems and inflorescence axes lacking elongate, multicellular, eglandular hairs.

Chromosome number.— $2n = 34$ (Solt & Wurdack 1980).

Phenology.—Flowering has been recorded in every month of the year.

Distribution and ecology.—*Miconia bicolor* var. *bicolor* occurs natively in southern Florida (Miami-Dade Co.), the Bahamas (Andros, Eleuthera, Grand Bahama, Great Abaco, and New Providence Islands), western Cuba

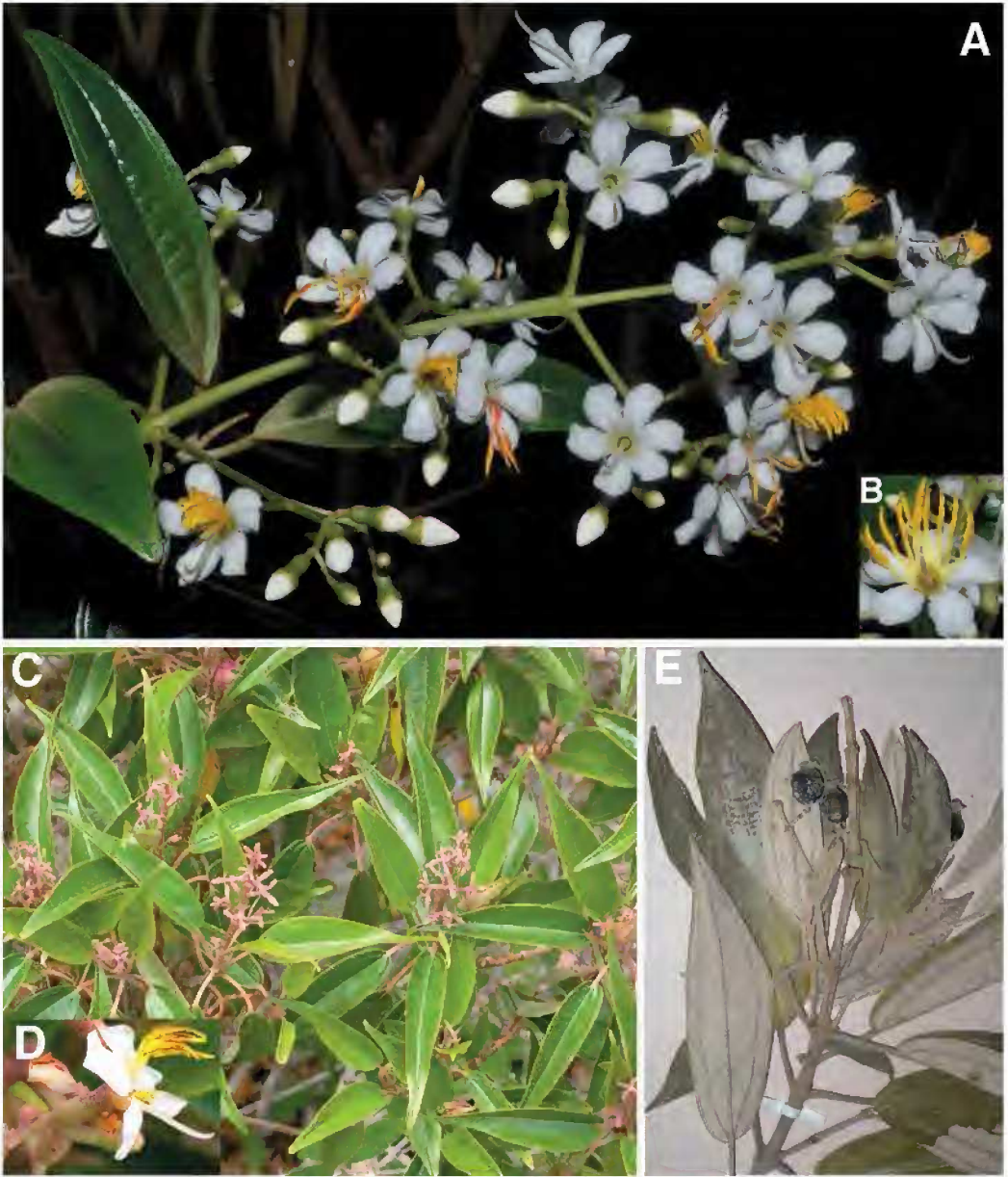


FIG. 3. **A, B:** *Miconia bicolor* var. *bicolor*: **A.** Inflorescence. **B.** Flower (plants in cultivation, Florida). **C, D:** *M. guajabonensis*: **C.** Plant with young inflorescences. **D.** Flower (Bécaquer & Abbott 82431). **E.** *M. impressa* (Ekman 17539).

(mainly in Prov. Pinar del Río, Isla de la Juventud), central Cuba (mainly in Prov. Cienfuegos, Sancti Spíritus, and Villa Clara) and, less commonly, the “Oriente” region (Prov. Guantánamo, Holguín and Santiago de Cuba), and on Hispaniola (widespread in the Dominican Republic and Haiti), growing in thickets or coppice, moist to dry broadleaved forests, and open to dense pine forests, pine and/or palm savannas, or disturbed habitats, on limestone, serpentine, or gravely to sandy soils, from near sea-level to 1200 m (Fig. 4). The species has been introduced into Hawaii, where it is locally naturalized in mesic to wet forests near Hilo (Wagner et al. 1990).

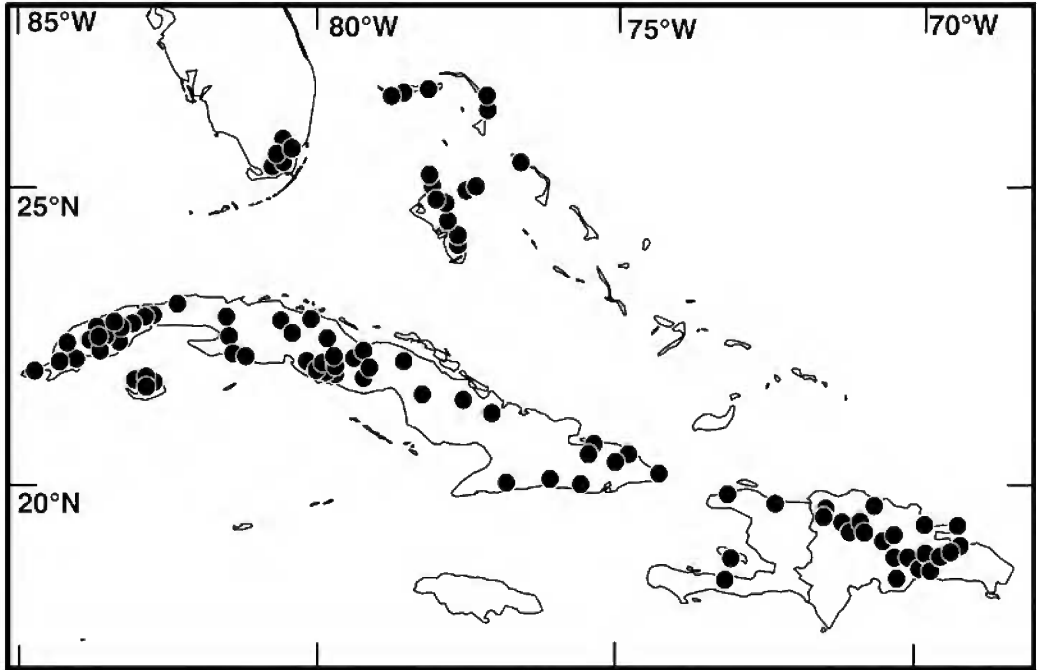


Fig. 4. Distribution of *Miconia bicolor*.

Additional specimens examined: **BAHAMA ISLANDS. Andros:** Mangrove Cay, 18 Aug–10 Sep 1906, *Brace 4960* (NY, US); Nicholl's Town, 5–6 Mar 1907, *Brace 6733* (NY); N of Love Hill, 29 Jan 1974, *D.S. Correll & Godfrey 41267* (FTG); S part of island, W end of airstrip, 24 Sep 1974, *D.S. Correll 43527* (FTG, NY); just S of Stafford Creek Bridge, 5 Dec 1976, *D.S. Correll & Proctor 47757-B* (FTG); 16–18 mi S of Andros Town on Fish Camp rd, 2 Mar 1966, *Dawson 26653* (DUKE, US); Coakley Town to Calabash Bay, 8 Mar 1966, *Dawson 26799* (US); Congotown District, E bank of South Bight, 5 mi S of Drigg's Hill jetty, 19 Mar 1986, *Eshbaugh & Wilson 86-75* (FTG); 2 mi N of Fresh Creek, 16 Mar 1966, *Gillis 6101* (MSC); along Queen's Hwy, 100 m S of Stafford Creek bridge, near Forfar Research Station, 27 Feb 1976, *Gillis 12859* (MSC); Forfar Field Station, town of Stafford Creek, 24°53'51"N, 77°55'56"W, 20 Jul 2002, *Goldman 2458* (FTG, GH); 2 mi NW of Love Hill, 24 May 1975, *Hill 3044* (FTG); near IFS Field Station, near Blanket Sound settlement, 15 Jul 1990, *Kjellmark 15* (DUKE); *ibid.*, 0.5 mi S of main rd, 20 Jun 1991, *Kjellmark 58* (DUKE, MO); near San Andros Motel, 13 Jun 1987, *Nickrent 2644* (NY); Nicols Town, May 1890, *J.I. & A.R. Northrop 127a* (GH); Mangrove Cay, 8 May 1973, *Popenoe 194* (FTG); near Lisbon Creek, Mangrove Cay, 16–19 Jan 1910, *Small & Carter 8468* (GH, NY, US). **Eleuthera:** Harbour Island to Lower Bogue, 18 Feb–4 Mar 1907, *E.G. Britton 6443* (NY); near turnoff to the Bluff from rd to Ridley Head, 8 Jan 1974, *D.S. Correll 41034* (FTG, NY); just E of The Bluff, 12 Jan 1974, *D.S. Correll 41207* (FTG); along Queen's Highway, N of Lower Bogue, 7 Apr 1978, *D.S. & H.B. Correll 49551* (FTG, NY). **Grand Bahama:** Queens Way, W of Freeport, 18 Mar 1971, *Austin & Conroy 4587* (FTG, NY); 7 mi NE of Freeport, 12 Feb 1966, *Beckner 824* (FLAS); Eight Mile Rocks, 5–13 Feb 1905, *N.L. Britton & Millsbaugh 2451* (NY); Gold Rock Creek, near E end of island, 28 Apr 1951, *Carr s.n.* (FLAS); Gold Rock Creek, near High Rock, 14 Sep 1951, *Carr s.n.* (FLAS, GH); near jct of Sandcombe Rd and Grasmere Dr, Freeport, 4 Nov 1973, *D.S. Correll 40481* (FTG); intersection of Settlers Way and East Mall, Freeport, 14 Aug 1974, *D.S. Correll & Kral 42816* (FTG, NY); Rand Memorial Park Nature Center Preserve, 1.5 mi from Freeport along Settlers Way, 31 Mar 1969, *Gillis 7758* (FTG). **Great Abaco:** Marsh Harbour, 9 Dec 1904, *Brace 1600* (NY); NW edge of Marsh Harbour, 15 Jun 1981, *D.S. Correll & Wasshausen 52032* (FTG, US); N of Coopers Town, 26°53.978'N, 77°33.097'W, 17 May 2000, *Freid 00-070* (FTG); Abaco National Park, 7 Jun 2004, *Freid 04-023* (FTG, NY); 1 mi E of airstrip at Marsh Harbour, 28 Mar 1966, *Perry 1776* (DUKE); 0.5 mi N of Dundas Town, 14 Dec 1979, *Wunderlin et al. 8265* (FLAS, GH, MO); main rd, 2.9 mi S of Wilson City rd, 16 Dec 1979, *Wunderlin et al. 8524* (GH, MO). **New Providence:** without definite locality, 2 Feb 1877, *Brace 465* (NY); Killarney pine barrens, 12–24 Mar 1907, *E.G. Britton 6536* (NY, US); Blue Hills Rd, 7–8 Apr 1904, *N.L. Britton 8* (NY); Farringdon Rd, 24 Aug 1904, *N.L. Britton & Brace 232* (NY); near Nassau airport, 19 Apr 1971, *Burch 4204* (MICH, MO, NY); without definite locality, 1859, *Cooper 82* (GH, NY); Thompson Blvd. near Portago Rd, Nassau, 23 Mar 1977, *D.S. & H.B. Correll 48265* (FTG, NY); Garden Hill Estates, Blue Hill area, Nassau, 4 Jun 1976, *D.S. Correll 47225* (FTG, NY); near Nassau, Jan–May 1903, *Curtiss 41* (A, GH, HAC, MIN, NY, P on-line image, US); near Harrold and Wilson Ponds, 21 Feb 1946, *Degener 18801* (GH, NY); S of Prospect Ridge, Nassau, 15 Feb 1946, *Degener 18836* (GH, NY); in pinetis, 22 Feb 1888, *Eggers 4180* (MICH, NY, P on-line image, US); W end of island, 23 Mar 1963, *Gillis 5347* (MSC); SW corner of island, 1 mi SW of Lyford Cay, 7 Jul 1969, *Gillis 8350* (FTG); along

Coral Harbour Rd, 4 May 1970, *Gillis 9202* (FTG); pinelands, 3 Jul 1948, *Ledin 268* (FTG); *ibid.*, 18 Aug 1948, *Ledin 315* (FTG); Nassau, 15 Jan 1890, *J.I. & A. R. Northrop 127b* (NY); S of Windsor Airport, W of Nassau, 2 Apr 1965, *Perry 1620* (DUKE); without definite locality, 3–5 Sep 1952, *von Reis 231* (MICH, US); N of Winsor Field, 77°28.5'W, 25°3.5'N, 13 Jul 1960, *Webster et al. 10457* (DUKE, US); 1 mi S of Nassau, 24 Feb 1905, *Wight 128* (GH, NY); Grantstown, 28–29 May 1909, *Wilson 8171* (NY). **CUBA. Prov. Camaguey:** Céspedes, El Quemado, 15 May 1915, *Roig et al. H-ROIG 898* (HAC); Queen City to Minas, 21 Nov 1909, *Shaffer 2925* (F, NY, US). **Prov. Ciego de Ávila:** Sierra de Judas, Cumanagua, 1–7 Aug 1985, *Canó O. & Herrera 146 SV-34725* (HAC). **Prov. Cienfuegos:** Cumanayagua, Sierra del Escambray, subida al Pico San Juan, 7 Nov 1987, *Arias et al. HFC-62964* (HAJB); *ibid.*, en el camino entre Los Tornos y El Naranjo, 3 Nov 1987, *Arias et al. HFC-62782* (HAJB); *ibid.*, lomas alrededor de Los Tornos, 4 Nov 1987, *Arias et al. HFC-62809* (HAJB); *ibid.*, San Blas, 300–400 m, 5 Aug 2004, *Bécquer et al. HFC-83168* (HAJB); *ibid.*, Las Vegas entre el cafetal y San Blas, cafetal de Buenos Aires, 29 Oct 1985, *Berazáin et al. HFC-58009* (HAJB); *ibid.*, 8 Oct 1986, *González L. et al. HFC-60246* (HAJB); Cumanayagua, Sierra del Escambray, loma al sur de Pico San Juan, 700–800 m, Nov 1975, *Bisse et al. HFC-28707* (HAJB); Cieneguita, 7 Jun 1895, *Combs 128* (F, GH, MICH, MO, NY, P on-line image); Cumanayagua, Complejo San Juan, 2 Nov 1986, *Exp. Conjunta P. Herrera et al. SV-35912* (HAC); Las Lagunas, Buenos Aires, 2500 ft, 6 Dec 1928, *Jack 6884* (A, NY, P on-line image, US); Soledad, Cienfuegos, 30 Mar 1936, *Jack 8758* (GH, P on-line image). **Prov. Habana:** al E de playa Baracoa, 23 Oct 1966, *Bisse HFC-189* (HAC); Loma La Pita, entre Campo Florido y Jaruco, 31 Nov 1974, *Bisse et al. HFC-25316* (HAJB). **Prov. Guantánamo:** Imías, Maisí, Tres Piedras, 700–900 m, 27 Jul 1984, *Álvarez et al. HFC-55049* (HAJB); pinar de Monte Cristi, 500–600 m, Jun 1967, *Bisse & Rojas HFC-3614* (HAJB); Monte Cristi, 700 m, May 1968, *Bisse & Köhler HFC-9327* (HAJB); Felicidad de Yateras, en la zona de Monte Cristi, 23 Aug 1971, *Bisse HFC-20223* (HAJB); orillas del río Baez, cerca del campamento “Los Naranjos”, 1–3 Aug 1975, *Bisse et al. HFC-26997* (HAJB); aserriero Nuevo Mundo, al S del aserriero, 300 m, Apr 1975, *Bisse et al. HFC-25816* (HAJB); Felicidad de Yateras, Pinar de Monte Cristi, 700 m, 13 May 1983, *Bisse et al. HFC-49401* (HAJB); al S de la Reservación de Cupeyal, 11 Feb 1970, *Borhidi et al. SV-35467* (HAC). **Prov. Holguín:** Sierra Cristal, valle del río Levisa desde Mandinga hacia arriba, Apr 1968, *Bisse & Köhler HFC-7412* (HAJB). **Prov. Isla de la Juventud (Isla de Pinos):** Sta. Fé, John Jungle, 19–22 Jun 1922, *Acuña SV-22673* (HAC); camino de cayo Piedras a Punta del Este, 4 Nov 1981, *Álvarez et al. HFC-45623* (HAJB); camino hacia Puente del Este, desde Cayo Piedras, 13 Apr 1974, *Arecos & Berazáin HFC-24876* (HAJB); Reserva Ecológica “Los Indios”, centro-oeste de la isla, al N del Hotel Colony entre el río Los Indios y el río Itabo, por el sendero ecológico desde la Estación Ecológica, 0–5 m, 31 Mar 2008, *Bécquer et al. HFC-85059* (HAJB); Nueva Gerona, cerca del Motel Rancho del Tesoro, 22 Dec 1966, *Bisse HFC-723* (HAJB); orillas de la laguna Santa Bárbara, 23 Dec 1966, *Bisse HFC-881* (HAJB); cerca de las Delicias, 23 Jul 1971, *Bisse HFC-19828* (HAJB); camino de cayo Piedras a Punta del Este, 24 Jul 1971, *Bisse HFC-19848* (HAJB); *ibid.*, 23 Oct 1976, *Bisse et al. HFC-32751* (HAJB); Sierra de la Cañada, 50–200 m, 1 May 1970, *Bisse et al. HFC-26297* (HAJB); near Nueva Gerona, 5 Apr 1904, *Curtiss 414* (F, GH, HAC, MIN, NY, P on-line image, US); Santa Bárbara, 3 Nov 1920, *Ekman 12104* (S); vicinity of Nueva Gerona, 6 May 1910, *Jennings 57* (NY); arroyo E de Los Indios, 18 May 1910, *Jennings 347* (GH); along rd to San Francisco de las Piedras, 10 Feb 1955, *Killip 44741* (GH, HAC, US); rd from Nueva Gerona to Santa Bárbara, 19 Nov 1955, *Killip 45110* (US); 2.5 km NW of Santa Bárbara on rd to Westport, 26 Jan 1956, *Killip 45471* (HAC, US); near Nueva Gerona, 30 Jun 1900, *Palmer & Riley 906* (NY); Sta. Fé, Hacienda San Juan, 12 Aug 1919, *Roig & Cremata SV-7117* (HAC); without definite locality, 25 Jun–10 Jul 1901, *Taylor 138* (GH); *ibid.*, *Taylor 138b* (F, MO, NY, US); *ibid.*, *Taylor 139* (F, GH, MO, NY, US). **Prov. Las Tunas:** Cerro de Dumañuecos, near Manatí, 31 Mar 1939, *Bros. León & Alain 18914* (GH, NY). **Prov. Matanzas:** Sabana de Cascajal, 30 Sep 1947, *Acuña SV-14784* (HAC); Sabanas de Lacret, casi en el límite con Las Villas, 30 Sep 1954, *Bro. Alain 4055* (GH, HAC); Jovellanos, San Miguel de los Baños, alrededores Loma Jacán, 21 Dec 1976, *Berazáin et al. HFC-33581* (HAJB); Playa Girón, monte seco, Nov 1967, *Bisse & Rojas HFC-4683* (HAJB); Playa Larga, península de Zapata, montes entre Caletones y Santo Tomás, 19 Feb 1977, *Bisse et al. HFC-34499* (HAJB); Aguada de Pasajeros, sabana al N del km 193 de la Autopista Nacional, 11 May 1984, *Bisse et al. HFC-54772* (HAJB); Ciénaga de Zapata, Batey Casa Nueva, 7 Jun 1978, *Oviedo et al. SV-30513* (HAC). **Prov. Pinar del Río:** Alturas Pizarrosas del Sur, Zona de Pizarras a lo largo de la carr. Entre Pinar del Río y Viñales, km 12–15, 22°50'N, 83°42'W, 140 m, 7 Jul 1993, *Acevedo-Rdgz. et al. 5705* (HAC); Viñales, Santo Tomás, May, *Acuña SV-9917* (HAC); San Vicente, Valle del Ancón, 2 Jun 1953, *Acuña & Correll SV-18664* (HAC); pinares prox. a Viñales, 30 Nov 1947, *Acuña SV-22688* (HAC); Sabanalamar, El Sábalo, Finca Fueyo, 2–5 Apr 1950, *Bro. Alain 1335* (HAJB, NY); entre San Vicente y El Ancón, 17 Mar 1957, *Bro. Alain & Proctor 6187* (HAC); Guanae, El Pitirre, en el terraplén desde Hermanos Barcón hasta la carretera de la Coloma, 19 Oct 1983m *Álvarez et al. HFC-50957* (HAJB); Bahía Honda, Sierra de Cajálbana, subida al Tecnológico Invasión de Occidente, 300 m, 15 Jul 1989, *Álvarez & Pujadas A. HFC-70164* (HAJB); Sandino, Carabelita, costa entre La Barca y el entronque de Carabelita, Guanahacabibes, 22 Nov 1973, *Arecos A. s.n.* (HAJB); Herradura, 20 Sep 1904, *Baker SV-2145* (F, GH, HAC, HAJB, NY, US); *ibid.*, 10 Apr 1905, *Baker & Diminoch SV-4860* (HAC, HAJB); *ibid.*, 10 Apr 1905, *Baker SV-5086* (HAC); Corral Viejo, cerca de la laguna vieja de Santa Teresa, 5–10 m, 6 May 2004, *Bécquer & Abbott HFC-82286* (FLAS, HAJB); Guane, El Sábalo, pinares de Sabanalamar, al S del pueblo, 5–20 m, 3 Apr 2001, *Bécquer & Veloso HFC-79848* (HAJB); Viñales, pinares alrededores de la carretera entre el entronque Ancón y el valle Ancón, 200–300 m, 13 Nov 2002, *Bécquer & Veloso HFC-81071* (HAJB); Sandino, potreros cerca de La Fé, 6 May 2006, *Bécquer & Morejón R. HFC-83986* (HAJB); Sanadino, San Ubaldo, reserva florística, 8 May 2006, *Bécquer & Morejón R. HFC-84011* (HAJB); Viñales, Moncada, Alturas de Pizarras del Sur, pinares al S de la Escuela de Espeleología, 11 May 2006, *Bécquer & Morejón R. HFC-84044* (HAJB); Guanes, cerca de La Fé, Mar 1967, *Bisse & Rojas HFC-1805* (HAJB); Guanes, laguna de Los Indios, Mar 1967, *Bisse & Rojas HFC-1833* (HAJB); Guanes, península de Guanahacabibes, Mar 1967, *Bisse & Rojas HFC-3078* (HAJB); La Palma, pinares al N de San Andrés, Dec 1967, *Bisse & Rojas HFC-4950* (HAJB); San Diego de los Baños, pinares al N de la Sierra de la Guira, Jul 1968, *Bisse et al. HFC-9534* (HAJB); Viñales, pinares al S del pueblo, 16 Nov 1968, *Bisse & Lippold HFC-9646* (HAJB); *ibid.*, *Bisse & Lippold HFC-9702* (HAJB); Viñales, pinares al S del pueblo, Nov 1986, *Bisse & Lippold HFC-10866* (HAJB); Las Ovas, lagunas al NO del pueblo, 1970, *Bisse & Lippold HFC-17390* (HAJB); La Guira, las Bermejales, al N de la Sierra de Guira, 200–300 m, Dec 1970, *Bisse & Lippold HFC-18380* (HAJB); Viñales, cañada de un arroyo en los pinares al SO del pueblo, Dec 1974, *Bisse et al. HFC-26430* (HAJB); lagunas al SO de Las Ovas, 5 Apr 1976, *Bisse et al. HFC-31122* (HAJB); Sumidoro, cerca de la confluencia de arroyo Cayo

Malo y arroyo Camarones, 12 Dec 1978, Bisse et al. HFC-38545 (HAJB); Mantua, monte al E de la desembocadura al arroyo Camarones, 27 Mar 1982, Bisse et al. HFC-43361 (HAJB); Las Ovas, laguna, 4 km al SO del pueblo, 50 m, 31 Mar 1982, Bisse et al. HFC-46704 (HAJB); San Luis, Las Llanadas, 50 m, 19 Dec 1982, Bisse et al. HFC-48582 (HAJB); Minas de Matahambre, Sumidero, zona Cejas de Francisco, 20 Jan 1984, Bisse et al. HFC-51457 (HAJB); Mantua, las Clavellinas, cayo Ciénaga del Prado, 16 May 1984, Bisse et al. HFC-54448 (HAJB); brazo del río Frio al E de Mantua, 24 Nov 1975, Borhidi & Capote SV-32857 (HAC); Sandino, península de Guanahacabibes, 25 Oct 1975, Borhidi & Delgado F. HPR-4185 (HAJB); vicinity of Herradura, 26–30 Aug 1910, N.L. Britton et al. 6603 (NY, US); San Diego de los Baños, 31 Aug–3 Sep 1910, N.L. Britton et al. 6746 (NY, US); vicinity of Pinar del Río, 5–12 Sep 1910, N.L. Britton et al. 7116 (NY); près de Viñales, 22°37'N, 83°3'W, 130 m, 17 Jun 1990, Dechamps et al. NH:12468 TW:49941 (MO); Municipio Las Ovas, Reserva Natural de El Punto, 83°33'W, 22°21'N, 10 Mar 1997, Dressler 192 (F); Herradura, 30 Mar 1907, Earle 656 (F, NY, US); *ibid.*, 16 Aug 1907, Earle 730 (NY); Santa Barbara, 5 Dec 1901, Earle s.n. (NY); Herradura, 12 Apr 1920, Ekman 10774 (S); S of Las Mangas, 25 Jul 1921, Ekman 13066 (S); Herradura, 27 Oct 1923, Ekman 17791 (NY, S); Consolación del Sur, Hato de las Vegas, El Tablazo, 26 May 1918, Fortiún & San Pedro SV-6887 (HAC); Consolación del Norte, Jun 1920, Ganganelli R-ROIG 2076a (HAC); Sandino, San Ubaldo, laguna del Toro, 30 Jan 1985, González L. et al. HFC-55343 (HAJB); La Fé, 7 Jan 1971, Grudzinskaya & Imchanitzkaja 768 (HAC); Consolación del Sur, Autopista Nacional entre Entronque de Herradura y foresta San Diego, 7 Feb 1992, Gutiérrez HFC-70380 (NY); Viñales, en el km 13, alrededores de la carretera de Viñales a Pinar del Río, 9 Feb 1991, Gutiérrez J. & Panfet C. HFC-69550 (HAJB); vicinity of San Diego de los Baños, 5 Jul 1915, Bro. León LS-5155 (HAC, NY); SE of Los Palacios, 7 Aug 1917, Bro. León & M. Roca LS-7377 (NY); entre Mangas y Candelaria, 27 Jan 1931, Bro. León LS-14766 (HAC, NY); S of Herradura, 7 Apr 1933, Bro. León LS-15936 (HAC, NY); Sabana cerca de Corojal, Laguna de Piedras, Candelaria, Apr 1937, Bro. León 16820 (HAC, NY); San Luis, Sabana de Santa Marta, 1 May 1940, Bro. León et al. LS-17821 (HAC); Laguna de Piedras, Mangas, 2 Mar 1939, Bro. León LS-18898 (HAC, NY); la Laguna de Piedras, Mangas, 20 May 1941, Bro. León 20078 (GH, HAC, NY); cercanías de La Fé, Feb 1942, Bros. León & Marie-Victorin LS-20497 (HAC, NY); montes cerca de la Jaula, 23 Feb 1977, Lepper L. et al. HFC-34367 (HAC, HAJB); Lagune de la Maquina, 4 Mar 1943, F. Marie-Victorin 58352 (GH); near Pinar del Río, 24 Feb 1900, Palmer & Riley 49 (US); near Coloma, 18 Mar 1900, Palmer & Riley 352 (US); Ancón, vereda de mina del Gato, a orillas del río Sajanal, 28 Jun 2007, Panfet C. HFC-85610 (HAC); without definite locality, Jul 1910, Ponce & Ramos H-ROIG 257 (HAC); 4 mi E of Candelaria, 16 Mar 1957, Proctor 16293 (A); Consolación del Sur, 29 Nov 1915, Roig & Van Hermann SV-6377 H-ROIG 1128 (HAC); San Diego, La Guira, Apr 1966, Samek V. SV-26081 (HAC); without definite locality, 23 Apr 1903, Shafer 274 (HAC, NY); Herradura to railroad, then to Paso Real, 11 Jan 1912, Shafer 11785 (A, F, MO, NY, US); *ibid.*, Shafer 11787 (NY); Los Palacios to San Juan de Zayas, 17 Jan 1912, Shafer 11807 (A, F, MO, NY, US); *ibid.*, Shafer 11809 (A, MO, US); San Juan y Martínez, cayo Ratones, 15 Feb 1989, Urquiola et al. HPR-5091 (HAJB); Ovas, El Punto, 5 Feb 1990, Urquiola et al. HPR-5811 (HAJB); Herradura, 1904, Van Hermann SV-270 (NY, P on-line image, US); *ibid.*, 1905, Van Hermann SV-560 (NY, P on-line image); *ibid.*, 1905, Van Hermann SV-573 (NY); *ibid.*, 1905, Van Hermann SV-596 (NY); *ibid.*, 26 Aug 1905, Van Hermann SV-773 (HAC); *ibid.*, 10 Sep 1905, Van Hermann SV-867 (HAC); *ibid.*, 21 Mar 1906, Van Hermann 2780 (A, GH, HAC, US); *ibid.*, 23 Jan 1905, Van Hermann SV-4478 (HAC); Puerta de Golpe, 27 Jan 1915, Van Hermann SV-5849 (HAC); entre Candelaria y Artemisa, 17 Sep 1904, Wilson 1713 (HAC, HAJB, NY); Vueltabajo, 23 Jul, and Retiro [near Taco Taco], 22 Jun, Wright 1222 p.p. (GH, NY, S); Retiro [near Taco Taco and possibly other localities], June, Wright 1222a (GH, NY, P on-line image, US); Retiro [near Taco Taco], 21 Jun, and Vueltabajo, 24 Jul, 1860–1864, Wright 2507 (GH, HAC, MO); Los Remales, 1660–1864, Wright s.n. (GH); without definite locality, Wright s.n. “308”, 1863 (S); *ibid.*, 1865, Wright s.n. (S); *ibid.*, Wright s.n. “980” (HAC); *ibid.*, Wright s.n. (HAC); San Julián, granja Sandino, Feb 1966, Yero M. SV-25996 (HAC); Viñales, cerca del camino, 9 Jun 1995, Yero D. HFC-81190 (HAJB). **Prov. Sancti Spiritus:** Sierra del Escambray, Topes de Collantes, Mogote mi Retiro, 79°50'W, 22°22'N, 850 m, 2 Jul 1993, Acevedo-Rdgz. et al. 5593 (HAC, US); Trinidad, Topes de Collantes, Pico Potrerillo, 750–950 m, 13 Apr 1991, Álvarez & Gutiérrez HFC-69444 (HAJB); falda S de las lomas de Banao, Areces et al. HFC-28997 (HAC, HAJB); Banao, camino entre el monument de Cantú y el tope de La Diana, 26 Oct 1986, Arias et al. HFC-59737 (HAJB); Jatibonico, El Patio, alrededor de la laguna Botijuela, 12 Feb 2002, Bécquer & Veloso HFC-79904 (HAJB); Sierra del Escambray, loma al O de la carretera, 5 km al S de Topes de Collantes, 600 m, 7 Nov 1968, Bisse & Lippold HFC-9662 (HAJB); Fomento, camino entre Santa Teresa y Gavilanes, 8 Nov 1979, Bisse et al. HFC-41022 (HAJB); *ibid.*, Bisse et al. HFC-41023 (HAJB); Fomento, valle del arroyo Gavilancito, 300–400 m, 10 Nov 1979, Bisse et al. HFC-41077 (HAJB); Trinidad Mts, slopes of Pico Potrerillo, 700–900 m, 12 Jun 1922, Ekman 13999 (F, S, US); Cabaiguán, El Arriero, 28 Jul 1918, Fortiún SV-6927 (HAC); Trinidad, El Tibisial, alrededores de loma Gavilanes, 29–30 Sep 2002, Gutiérrez et al. HFC-80247 (HAJB); Loma de la Jagua, Los Helechales, Banao, 10 Aug 1915, Bros. León & Clement LS-5395 (HAC, HAJB, NY); from Trinidad to Tope de Collantes, Jul 1938, Bro. León LS-18430 (GH, HAC, NY); Loma de la Gloria, Banao Mts, 29 Jul 1918, Bro. León & M. Roca LS-8003 (HAC, NY); Lomas de Banao, May 1920, Luua 591 (F, HAC); Loma Caballote de Casa, 400–700 m, 8 Nov 1979, Imchanitzkaja & Herrera 448 (HAC). **Prov. Santiago de Cuba:** Gran Piedra, carretera de la Piedra a la Mercedita, 1200 m, 25 May 2004, Bécquer et al. HFC-82538 (HAJB); Guamá, Mogote Peak [Pico Turquino], 27 Feb 1939, Bucher 116 (HAC); Guamá, Sierra del Cobre, subida a la loma El Espejo, 30 Apr 1989, Dietrich H. et al. HFC-67756 (HAJB). **Prov. Villa Clara:** Sabanas de Manacas, 6 Jun 1950, Acuña & Correl SV-18663 (HAC); Sabanas de Manacas, orillas de la Carretera Central, 13 Apr 1954, Bro. Alain 4013 (GH, HAC, US); Manacas, al N del pueblo, 19 Nov 1966, Bisse & Rojas HFC-435 (HAJB); *ibid.*, al S del pueblo, Feb 1967, Bisse & Rojas HFC-1497 (HAJB); Cartagena, cerca de Santiago, Apr 1967, Bisse & Rojas HFC-2142 (HAJB); Huff's farm, near Manacas, Jun 1941, Howard 5500 (GH, NY, US); Placetias del Sur, 29 Jul 1916, Bro. León LS-6405 (HAC, NY, US); Motembo, 10 Aug 1918, Bro. León & M. Roca LS-8213 (NY); Sabana de Motembo, 28 Aug 1922, Bro. León LS-11369 (HAC, NY); near Manacas, 11 Jul 1936, Smith & Hodgdon 3097 (F, GH, MICH, MO, NY, P on-line image, S, US). **DOMINICAN REPUBLIC. Distrito Nacional:** Sierra de Yamasá, Sierra Prieta, próximo al nacimiento del arroyo Tosa, 80 m, 12 Jun 2005, Clase & Ángeles 4060 (FLAS); El Manielito, 23 Jan 1929, Ekman H11313 (S, US); Sierra Prieta, 18.65386°N, 69.9689°W, 120–125 m, 20 Jul 2012, Jestrow 2012-244 (FLAS); Sierra Prieta, Villa Mella, 150–200 m, 24 Oct 1975, Liogier 24117 (JBSD, NY); Sierra Prieta, al NE de Villa Mella, camino a Yamasá, a la orilla del arroyo Mina próximo a un potrero, 18°19'N, 69°58'W, 70 m, Vélaz et al. 103 (FLAS, JBSD); Sierra Prieta, NE de Villa Mella, camino a Yamasá, 18°19'N, 69°58'W, 60

m, *Veloz et al.* 323 (FLAS, JBSD). **Prov. Dajabón:** Cerro de Chacuey, Partido, Dajabón, 300 m, 18 Aug 1973, *Liogier 20004* (F); Cordillera Central, Municipio de Partido, Cerro de Chacuey, Loma Las Mercedes, 19°26'55.1"N, 71°36'79.9"W, 400 m, 11 May 2005, *Veloz & García 3757* (FLAS, FTG, JBSD); Municipio de Partido, Cerro de Chacuey, entrando por Cajuil, 19°26'31.9"N, 71°34'52.8"W, 385 m, 11 May 2005, *Veloz & García 3821* (JBSD). **Prov. Hato Mayor:** Sabana de la Mar, 8 Jul 1930, *Ekman H15599* (S). **Prov. La Vega:** Cordillera Central, 10 km S de la carretera La Vega – Santiago, en la carretera hacia Jarabacoa, 19°11.5'N, 70°35'W, 490 m, 11 Dec 1995, *García et al.* 6067 (F, JBSD, MO); Cordillera Central, 7.5 km NE of Jarabacoa on rd to Bayacanes and La Vega, 630 m, 25 May 1992, *Judd 6623* (FLAS, JBSD); Loma del Puerto, La Vega, 400 m, 18 Jun 1969, *Liogier 15723* (NY, US). **Prov. María Trinidad Sánchez:** Los Haitises, La Manaclita, 2 Jul 1930, *Ekman H15528* (A, S, NY, US). **Prov. Monseñor Nouel:** Cordillera Central, SE of Bonaó, Falcombridge Dominicana mine, at top of Loma Larga, 650 m, 14 May 1992, *Judd 6516* (FLAS, JBSD); Loma Peguera, Barrancón, from Bonaó to Hato Viejo, 200–300 m, 17 Apr 1969, *Liogier 14874* (GH, JBSD, NY, US); Cordillera Central, Falcombridge Dominican mine in the area of Loma Peguera, Loma Larga, on the top, 650 m, 14 May 1992, *Shean 3125* (MICH, MSC); 5 km SE of Bonaó, at Falconbridge Dominicana Mine, 18°45'N, 70°15'W, 28 Jul 1981, *Watson 1191* (FLAS, FTG); *ibid.*, 29 Jul 1981, *Watson 1264* (FLAS, FTG); SE of Bonaó, Loma La Peguera vicinity, Falcombridge Dominicana mine, on Loma Larga, 18°50'N, 70°25'W, 28 Jul 1981, *Zanoni et al.* 15665 (FLAS, JBSD, NY, US). **Prov. Monte Plata:** 12.5 km NE de Bayaguana y 3.5 km NW del poblado Trinidad, en el lugar llamado Sabana Larga, 18°50'N, 69°32'W, 190 m, 14 Sep 1987, *García & Pimentel 2347* (FLAS, JBSD); Batey Guanuma, 100 m de la finca experimental de la Univ. "CDEP", 60 m, 31 Jul 1992, *F. Jiménez 583* (FLAS, JBSD); Rincón Dajao on Yamasá rd, 10 mi N of Santo Domingo city, 150 m, 26 Jun 1968, *Liogier 11841* (GH, JBSD, NY, P on-line image, US); Los Haitises, próximo al Río Comate, 1 km NE del poblado Comatillo (al NE de Bayaguana), 18°48'N, 69°36'W, 100 m, 10 May 1991, *Zanoni & F. Jiménez 45222* (FLAS, JBSD). **Prov. Puerto Plata:** Puerto Plata, Samanas rd, 10 Feb 1871, *Wright et al.* 522 (US). **Prov. Samaná:** Península de Samaná, Cabo Cabrón, 100 m, 12 Nov 1993, *Salazar et al.* 1260 (FLAS, JBSD). **Prov. San Cristobal:** 30 km from Santo Domingo City on Duarte Highway, 28 Jun 1972, *Liogier 18648* (F, JBSD, NY, US). **Prov. Sanchez Ramirez:** Campamento Los Pinos, Maimón, 250 m, 31 May 1977, *A. & P. Liogier 26656* (JBSD, MO, NY, US). **Prov. Santiago:** Cordillera Central, Municipio San José de las Matas, sección Los Ramones, en la carretera hacia Monción, después de Jicomé, 689 m, 20 Aug 2011, *Clase et al.* 6896 (FLAS, JBSD); Jicomé, San Jose de las Matas, 600–700 m, 21 Jun 1933, *Valeur 935* (F, MO, NY, US). **Prov. Santiago-Rodríguez:** between Sabaneta and Santiago de la Cruz, 24 Apr 1970, *J. Jiménez & Ariza Julia 5824* (NY); *ibid.*, 25 Apr 1971, *J. Jiménez & Ariza Julia 5924* (FLAS, GH, UCMM, US); Cordillera Central, along rd between La Leonor and El Aguacate, 3 km W of La Leonor, 600 m, 30 May 1992, *Judd 6669* (FLAS, JBSD); Cordillera Central, El Cajuil, 10.2 km al SE de Monción, 19°21'N, 71°12'W, 600 m, 16 Jul 1985, *Mejía et al.* 1408 (FLAS, JBSD, NY). **HAITI. Dept. de Nippes:** Massif de la Hotte, Corail, near Dutreuil, 200 m, 29 Sep 1928, *Ekman H10765* (A, S, US). **Dept. de l'Ouest:** Ile La Gonave, Lotoroué, 650 m, 28 Jul 1927, *Ekman H8722* (GH, NY, S, US); Gonave Island, near Pte. à Raquette, 1927, *Eyerdam 240* (F, GH, NY, US). **Dept. du Nord:** Massif du Nord, Acul du Nord, Morne Haut du Cap, hill at the Acul Bay, Morne Bois-Pin, 100 m, 16 Dec 1924, *Ekman H2888* (S, US). **Dept. du Nord Ouest:** vicinity of Jean Rabel, S of town, 1–13 Mar 1929, *E.C. & G.M. Leonard 13629* (GH, MO, NY, US). **UNITED STATES OF AMERICA. Florida. Miami-Dade Co.:** F.I.U. Preserve, 25°45.24'N, 80°22.57'W, 24 Apr 2005, *Adonizio 2* (FTG); off US 1 between Homestead and Naranja, 9 Jun 1973, *Almeda 1937* (USF); Long [Pine] Key, Everglades, May 1908, *Bessey 24* (MSC); *ibid.*, *Bessey 50* (MSC); Pine Hammock Trail [Long Pine Key], Everglades National Park, 6 Jul 1965, *Bourdo s.n.* (MSC); Florida City, 16 Jul 1965, *Bourdo s.n.* (MSC); Goulds Pineland, SW 120 Ave at 224 St, 7 Jun 1998, *Bradley 1808* (FTG); Lucille Hammock Preserve, 0.8 mi W of SW 217 Ave, 0.6 mi S of 344 St, 25.438°N, 80.555°W, 5 Jul 1998, *Bradley 1908* (FTG); near Homestead, Feb 1929, *Buswell s.n.* (FTG); *ibid.*, 8 Jul 1934, *Buswell s.n.* (FTG); Long Pine Key, 17 Jul 1937, *Buswell s.n.* (FTG); Timb's Hammock, Homestead, 5 Mar 1952, *Caldwell 8758* (FLAS, FTG, MIN); 6 mi SW of Homestead along Rt 27, 12 Mar 1956, *Churchill s.n.* (MSC); Everglades National Park, Palma Vista Hammock, SW of Homestead, 12 Oct 1962, *Cooley et al.* 9201 (USF); Miami, Timbs Hammock, 26 Feb 1953, *Diaz-Pferrer 49* (HAJB); near Naranja, 27 Apr 1937, *Fennell 382* (NY); Sykes Hammock, 4 mi NW of Homestead, 27 Jan 1916, *Harris C1626* (MIN), *ibid.*, 15 Mar 1917, *Harris C17366* (MIN); Murden Hammock, 2 mi W of Goulds, 28 Jan 1916, *Harris C1639* (MIN); *ibid.*, 27 Apr 1923, *Harris N23226* (MIN); near Long View School, 15 Mar 1917, *Harris C17386* (MIN); Hattie Bauer Hammock, 19 Mar 1917, *Harris C17398* (MIN); Royal Palm Hammock, 14 Dec 1922, *Harris C22937* (MIN); Tim's Hammock, 27 Apr 1923, *Harris N23158* (MIN); 0.5 mi S of Naranja, 27 Apr 1923, *Harris N23257* (MIN); Royal Palm State Park, 6 Nov 1927, *Hawkins s.n.* (FLAS); Everglades National Park, E end of Long Pine Key, 25 Jul 1987, *Herndon 1760* (FLAS, FTG, NY); Everglades National Park, Long Key Campground, 80°39.28'W, 25°24.24'N, 5 Apr 1999, *Hess et al.* 8560 (FLAS, NY); S of 216 St, 7.4 mi SW of jct with 194 Ave, W of Goulds, 12 Mar 1975, *Hill & Popenoe 2573* (FTG); Long Pine Key, Everglades National Park, 25 Jun 1970, *Inman 20* (FTG); Tamiami Trail to Florida Keys, Dec 1929, *Jemings s.n.* (USF); Subtropical Horticultural Research Station, Chapman Field, Coral Gables, 21 Jul 1989, *Judd 5900* (FLAS); Goulds, near jct of 248th St and 159th Ave, 17 Jul 1995, *Judd 7073* (FLAS); Girl Scout Park, Homestead, 13 Aug 1963, *Lakela 26183* (USF); Homestead, 20 Jul 1964, *Lakela 27323* (FLAS, USF); near North Homestead, 25 Jun 1968, *Lakela 31900* (USF); U.S. Coast Guard Station, 25.64°N, 80.30°W, 18 May 2001, *Lane et al. s.n.* (FTG); Castellow Hammock, 25°3.6'E × 80°5.1'E, 8 Jun 1999, *Lobo & Beck-King 031* (FTG); SE corner of SW 224 St and SW 120 Ave, Homestead, 30 Nov 1991, *Mears s.n.* (USF); SW 78 Ave & 176 St, 9 Feb 1974, *Molnar s.n.* (FTG); 1 mi W of Homestead, off Avocado Dr, Fuchs Hammock, 26 Jul 1990, *Morris 4087* (FLAS); 0.2 mi W of Tower Rd, 0.2 mi N of Lucille Dr (SW 360th St), 1.5 mi W of Florida City, Navy Wells Pineland, Royal Palm Ranger Station, 35°26'07"N, 80°30'23"W, 8 ft, 4 Sep 1999, *Orzell & Bridges 18168* (FTG, USF); near Camp Osaïsa Bauer, 3 mi N of Homestead, 5 Jul 1976, *Popenoe 656* (FTG); Royal Palm State Park, 5 Mar 1944, *Rhodes s.n.* (FLAS); Everglades National Park, near Long Pine Key campground, 17 Dec 1971, *Poppleton s.n.* (USF); Castellow Hammock, Dec 1966, *Roberts 59* (FTG); Homestead, 7 Jun 1960, *Rosbach 1876* (FLAS); Homestead, 7 Mar 1908, *Sargent s.n.* (A); SW 117 Ave and Killian Dr, Miami, 17 Jun 1980, *Sauleda 3592* (USF); 2 mi N of Rt 27 on SW 217 Ave, 20 Oct 1968, *Schmal et al. s.n.* (FTG); Homestead, 7 Jun 1937, *Scull s.n.* (FLAS); near Homestead Rd, between Cutler and Longview Camp, 9–12 Nov 1903, *Small & Carter 994* (MIN, NY); *ibid.*, *Small & Carter 1106* (NY); between Homestead and Camp Jackson, 1 Nov 1906, *Small & Carter s.n.* (MIN); Long [Pine] Key, 6–7 May 1903, *Small & Wilson 1649* (NY); near the Homestead Trail, near Camp Longview, 13–16 May 1904, *Small*

& Wilson 1696 (NY); *ibid.*, *Small & Wilson* 1932 (NY); between Homestead and Camp Jackson, 1 Nov 1906, *Small & Carter* 2625 (NY); between Homestead and Cross Key, 21–22 Nov 1906, *Small & Carter* 2634 (NY); Long [Pine] Key, Everglades, 18–26 Jan 1909, *Small & Carter* 3060 (NY); near Goodburn Hammock, 21 Jun 1915, *Small & Mosier* 6377 (NY); *ibid.*, *Small & Mosier* 6389 (NY); about Sykes Hammock, 2 Jul 1915, *Small et al.* 6749 (FLAS); Everglades National Park, Dryopteris Hammock, 9 Aug 1961, *Smith* 676 (USF); Everglades, 3 Jul 1971, *Sreemadhavan* 4980 (USF); N of South Dade Baptist Church, Florida City, corner of 296 St and 172 Ave, 27 Jul 1990, *Tan AV7* (USF); Fire gate rd #1, Long Pine Key, Everglades National Park, *Tomlinson* 21-VII-63C (FTG); Homestead, NE 10th St, 1.5 blocks E of Krome Ave, 28 Apr 1958, *Traverse* 650 (FTG); SW of Homestead, 14 May 1919, *Small & Cuthbert s.n.* (FLAS); Homestead, 10 May 1929, *Weber s.n.* (FLAS); 0.7 mi W of Eureka Rd-Old Cutler Rd jct, R40E, T56S, 21 Jun 1960, *Webster & Williams* 10050 (FTG); N of Homestead, 18 Aug 1934, *Welch* 1525 (NY); Everglades National Park, near jct of Anhinga Rd off Research Center Rd, 7 Jul 1984, *Whetstone* 14428 (NY); between Homestead and Florida City, near FL 27, 4 Jun 1966, *Whitney* 39 (USF); Redlands, Silver Palm Hammock, 23 Jun 1952, *Wilson F-9* (USF); Tamiami Pineland Complex Addition, 15 mi SW of downtown Miami, S of 12260 SW 130th St, 25.644°N, 80.393°W, 28 Apr 1999, *Woodmansee* 314 (FLAS, FTG).

Miconia bicolor var. *bicolor* is the most common and widely distributed taxon of *Miconia* sect. *Miconiastrum*. It is also the most variable. Plants of the Bahamas and southern Florida are phenetically most similar to those of western Cuba (i.e., Prov. Pinar del Río), however, they consistently have mite domatia, while those of Pinar del Río are variable: some having domatia and some lacking these structures. Some plants of Pinar del Río and Isla de la Juventud have the stems, abaxial surface of their leaves, and hypanthia nearly to somewhat glabrescent and covered with a sticky secretion (e.g., *Acevedo-Rdgz et al.* 5706, *Acuña* SC-22673, *Bécquer et al.* HFC-85059, *Killip* 44741, *Roig & Cremata* SV-7117, and *Yero D.* HFC-81190). Another group of plants have stems, abaxial surface of their leaves, and hypanthia conspicuously lepidote, and the adaxial leaf surface often drying a distinctive yellowish color (e.g., *Bécquer & Abbott* HFC-82286, *Bécquer & Morejón R.* HFC-83986, *Bécquer & Morejón R.* HFC-84011, and *Bro. León et al.* LS-17821). Variation within Pinar del Río may be ecologically correlated, but more fieldwork (and intensive molecular sampling) is required. Plants of Hispaniola are distinctive in having stems with hairs more or less globular-stellate, stellate-peltate, to dendritic and erect (see numerous specimens cited above), while stems with appressed stellate-scales or branched hairs characterize plants of other regions, except that a few specimens with erect, dendritic hairs also occur in plants of central Cuba (in the Tope de Collantes, and Pico Potrerillo regions, Prov. Sancti Spiritus; e.g., *Acevedo-Rdgz et al.* 5593, *Ekman* 13999, *León* LS-18430). These Cuban collections also are distinctive in usually having obvious calyx lobes with evident teeth, while most populations of *M. bicolor* var. *bicolor* have lobes that are essentially obsolete and lack calyx teeth, although some plants with well-developed, or at least evident, lobes also have been collected in Pinar del Río (e.g., *Britton et al.* 7116, *Earle* 656, *Shafer* 11787). We note also that some collections from Prov. Sancti Spiritus (e.g., Loma los Helechales, *León & Clement* LS-5593 and Loma la Gloria, *León & Roca* LS-8003) have well-developed calyx lobes, but stems with appressed hairs. The Hispaniolan collections, as is typical of *M. bicolor*, usually have calyx lobes that are obsolete or nearly so, but some have more or less evident lobes and teeth (e.g., *Ekman* H8722, *Jiménez & Ariza* Julia 5824, *Leonard & Leonard* 13629, *Valeur* 935). Some Hispaniolan specimens also have stems and young leaves with a sticky secretion (as also seen in some western Cuban plants). Most plants of central Cuba (Prov. Villa Clara, Lomas de Banao and Jatibonico in Sancti Spiritus and Cieneguitas, Cienfuegos) are distinctive in their often extremely pale to white-lepidote beneath (e.g., *Alain* 4013, *Bécquer & Veloso* HFC-79904, *Combs* 128, *Howard* 5500, *León* LS-11369, and *Smith & Hodgdon* 3097). On the other hand, material from Cumanayagua, Cienfuegos, are more or less ferruginous beneath (and these plants also have strongly plinerved leaves; see specimens examined). Leaf shape also varies greatly within *M. bicolor* var. *bicolor*, and plants of Hispaniola tend to have leaves more similar to those of *M. angustiflora* than to those of populations of *M. bicolor* var. *bicolor* in western and central Cuba, the Bahamas, or Florida. The abaxial leaf indumentum of stellate-peltate scales, however, clearly distinguishes these Hispaniolan populations from *M. angustiflora*, which has stellate hairs abaxially.

In summary, it is clear that several poorly differentiated geographical races exist within the array of populations here considered as *M. bicolor* var. *bicolor*. These are not provided formal nomenclatural recognition because individual specimens are not always clearly diagnosable as to the entity characteristic of each geographical region. These geographically-correlated entities are 1) the populations of southern Florida and the Bahamas, 2) those of Prov. Pinar del Río and the Isla de la Juventud, Cuba (and within this region there seems to be at least

two phenetic groups, perhaps ecologically correlated), 3) those of Prov. Villa Clara, Cuba, 4) those of the Tope de Collantes and Pico Potrerillo regions, Prov. Sancti Spiritus, Cuba, 5) those from Cumanayagua, Cienfuegos, Cuba, and 6) those of the island of Hispaniola. The Tope de Collantes/Pico Potrerillo and Hispaniolan entities are the most phenetically divergent. Finally, there are a few collections of *M. bicolor* from the "Oriente" region, especially Guantánamo and Santiago de Cuba, and these require more study. *Miconia bicolor* appears to be much less common in this region than it is in central and western Cuba, and some of these specimens are difficult to distinguish from *M. barbata* or *M. maestrensis* (see discussion under these two species). More field work in these eastern provinces of Cuba is needed, along with population-level molecular study. Some specimens, e.g., Álvarez *et al.* HFC-55049, Bécquer *et al.* HFC-82538, Bisse *et al.* HFC-26997, Bisse & Rojas HFC-3614, Bisse & Köhler HFC-7412, are tentatively treated within *M. bicolor*, while others, e.g., Bros. León & Alain LS-19256, Michelangeli *et al.* 1559, Shafer 2975 and Shafer 3765, although somewhat similar, are considered within *M. barbata* (because of the form of their hairs). We note that *M. barbata* and *M. maestrensis* have stellate hairs (not the stellate-peltate scales of *M. bicolor*) on their adaxial leaf surfaces (see key for other differentiating characters).

It is obvious that *Miconia bicolor* is most diverse on the island of Cuba, and it is noteworthy that var. *patenti-setosa* is endemic to Cuba. We hypothesize that the species originated on this island, only later dispersing to Hispaniola, the Bahamas, and southern Florida.

Miconia bicolor was first reported from the United States by J.K. Small (1905) based on populations collected in pinelands (*Pinus elliottii* Engelm.) of Miami-Dade county. The species is restricted to this county, and is most characteristic of pinelands on Miami oolitic limestone. These pinelands largely have been destroyed by agriculture and urban growth (Myers & Ewel 1990) and the species thus is considered threatened by the state of Florida (Weaver & Anderson 2010). *Miconia bicolor* is occasionally used as an ornamental (Meerow 1991; Osorio 1991; Haynes *et al.* 2001;). Beautiful illustrations have been published by de la Sagra (1850), Sargent & Faxon (1911), Correll & Correll (1982), and Wurdack & Kral (1982).

2b. *Miconia bicolor* (Mill.) Triana var. ***patenti-setosa*** (Borhidi) Judd, Bécquer, & Majure, comb. nov. *Tetrazygia bicolor* (Mill.) Cogn. var. *patenti-setosa* Borhidi, Acta Bot. Acad. Sci. Hung. 23:39. 1978. TYPE: CUBA. PROV. PINAR DEL RÍO: Cerro de Cabras, 10 Oct 1954, fr. Acuña & Torres 19461 (HOLOTYPE: HACI; ISOTYPE: HACI, HAJB!).

Stems and inflorescence axes with scattered, elongate, multicellular, eglandular hairs.

Phenology.—The taxon has been collected in fruit only in October.

Distribution.—*Miconia bicolor* var. *patenti-setosa* is only known from Cuba, Prov. Pinar del Río, in the Cerro de Cabras.

Miconia bicolor var. *patenti-setosa* is known only from the type; additional collections are needed, and the taxon is here only provisionally recognized. It is of interest that no other taxon of *Miconia* sect. *Miconiastrum* has elongate, multicellular hairs on the stems; such hairs are only known from mite domatia.

3. *Miconia guajaibonensis* Judd, Bécquer, & Majure, nom. nov. (**Fig. 3C, D**). *Tetrazygia lanceolata* Urb., Repert. Spec. Nov. Regni Veg. 22:223. 1926, non *M. lanceolata* DC., Prodr. 3:190. 1828. TYPE: CUBA. Prov. Pinar del Río: Pan de Guajaibón, on the very top of the mountain, 750–800 m, 9 Jan 1921, fl, E.L. Ekman 12767 (LECTOTYPE: SI, here designated, because holotype at B destroyed; ISOLECTOTYPE: NY!, fragment).

Evergreen **shrub** up to 4.5 m. Young **stems** terete to slightly quadrangular, the indumentum of dense, multicellular, ferruginous, matted to erect, dendritic to globular stellate hairs or appressed stellate-peltate scales, becoming ± glabrate with age, without elongate, multicellular, non-glandular hairs, internodes 0.5–1.8 cm long, lacking longitudinal ridges, nodal line present, faint. **Leaves** isophyllous or nearly so; petiole 0.7–2.5 cm long, the indumentum of dense, ± matted, stellate-peltate scales to stellate-peltate scales, partially deciduous with age; the blade 3–8.6(–9.3) × 0.7–2.4(–3.3) cm, ovate, usually falcate, chartaceous, the apex acuminate to attenuate, the base obtuse to rounded, the margin plane to slightly revolute, entire; secondary veins two pairs, one pair conspicuous and one pair inconspicuous, acrodromous, basal, the innermost pair joining midvein at base to 1 mm above the leaf base, the conspicuous secondary veins placed 0.8–3.5 mm in from margin, the inconspicuous secondary veins intramarginal, tertiary veins percurrent, oriented subperpendicular to midvein,

0.7–4 mm apart, quaternary veins obscure to visible, \pm reticulate, not connecting adjacent tertiary veins or with 1–3 quaternaries connecting adjacent tertiary veins, the higher order veins reticulate; the midvein and major secondary veins slightly impressed to flat, tertiary and higher order veins flat on adaxial surface, the midvein moderately to strongly raised, the major secondary veins flat to moderately raised, the minor secondary veins and tertiary veins flat, and the higher order veins flat on the abaxial surface; adaxial surface appearing smooth to slightly wrinkled after drying, with scattered to abundant druse crystals, and drying darker than the abaxial surface, the indumentum initially of dense, pale ferruginous, stellate-peltate scales, but very quickly glabrescent, although a few scales often retained on midvein proximally; abaxial surface pale green but pale ferruginous due to dense covering of stellate-scales, the epidermal surface \pm smooth, with dense, appressed, ferruginous or pale ferruginous, stellate-peltate scales, 0.09–0.17 mm across, the veins with similar scales, but sometimes more irregular in form, such hairs on lamina and veins \pm persistent; mite domatia present or absent, at junction of midvein and major secondary veins, consisting of dense cluster of multicellular, elongate, pale ferruginous to red, barbate, eglandular hairs, 0.5–1 mm long. **Inflorescences** terminal, paniculate cymes, 3.5–9 cm long, 2.5–6.5 cm across, with 2–4 major branch pairs, the peduncle 1.7–3.8 cm long, the ultimate axes (pseudopedicels) 1–5.5 mm long, and numerous flowers well separated from each other; bracts 0.7–1 \times 0.2–0.4 mm, but probably also larger, \pm triangular or narrowly so, with acute to obtuse apex, early deciduous; bracteoles 0.4–0.7 \times 0.1–0.2 mm, narrowly triangular, with acute apex, \pm deciduous. **Flowers** 5-merous, zygomorphic (due to positioning of the stamens), with pedicel 1.3–3 mm long. **Hypanthium** 4.5–6 mm long, terete and \pm slightly constricted above ovary, the free portion 1.8–3.3 mm long, 2.2–2.8 mm wide at the torus, the outer surface with moderate to dense, stellate-peltate scales, the internal surface smooth, glabrous. **Calyx** lobes 5, separate (and imbricate) in bud, the tube 1–1.7 mm long, irregularly tearing between lobes, with moderate to dense stellate-peltate scales abaxially, and moderate to dense stellate-peltate to globular stellate hairs adaxially, the lobes unequal, usually the 2 outer lobes larger than the rest, 0.45–1.2 \times 1–2.4 mm, triangular to shortly triangular, the apex rounded to obtuse, with hairs similar to those of the tube, green, often red-tinged; calyx teeth present, \pm 0.1 mm long, merely a dorsal, slightly ellipsoidal bump, with rounded apex, and hairs similar to those of calyx. **Petals** 5, 4.5–6.3 \times 2.5–4 mm, obovate, spreading, white, glabrous but both surfaces densely papillose-granulate, the apex rounded and asymmetrically notched, the base slightly narrowed to a broad attachment, the margin entire. **Stamens** 10, isomorphic, \pm geniculate near filament apex; staminal filament 4.5–5.5 mm long, glabrous, pale yellow, anther thecae 5–5.8 \times 0.6–0.8 mm, subulate, straight to slightly incurved, opening by a small dorso-apical pore, yellow, the connective not prolonged below the thecae, glabrous, but the filament emerging from slight depression in sterile, minutely dorso-lobed anther base. **Ovary** 3-locular, ca. 4/5-inferior, 3.4–3.7 mm long, 1.4–2 in diameter, oblong to ellipsoid, apically conic, unridged, glabrous, the apex with a short, slightly ridged collar but lacking a crown, with axile placentation, the ovules numerous, borne on a small placenta not extending or only slightly extending into locule; style 10–13 mm long, distally curved, white, glabrous; stigma punctate, minutely papillose, 0.15–0.2 mm wide. **Berries** 5–8 mm long, 4.3–6.5 mm in diameter (excluding persistent hypanthium and calyx tube), globose to ellipsoid, purple-black, with scattered stellate-peltate scales, the hypanthium constricted, 1.3–1.7 mm wide at narrowest point and 2–3 mm wide at torus, but appearing strongly constricted due to flaring calyx tube. **Seeds** 1.1–1.6 mm long, angular-obovoid, with \pm rectangular raphe, the testa \pm smooth; appendage absent.

Phenology.—Recorded in flower in January, March, May and November.

Distribution and habitat.—*Miconia guajaibonensis* is endemic to Pan de Guajaibón, in Pinar del Río, Cuba (Fig. 5), from 680–800 m, in thickets over limestone.

Additional specimens examined: **CUBA. Prov. Pinar del Río:** Pan de Guajaibón, la Mulata, 16 May 1953, *Acuña & Bro Alain* SV-18519 (HAC); en la cumber del Pan de Guajaibón, 750 m, 2 May 1959, *Bro. Alain* 6778 (HAC); Bahía Honda, Pan de Guajaibón, ladera N, cerca de la cima, 680–700 m, 30 Mar 2004, *Béquer HFC-81700* (HAJB); cima del Pan de Guajaibón, 700 m, Jul 2005, *Béquer & Abbott HFC-82431* (FLAS, HAJB); La Palma, cima del Pan de Guajaibón, 720 m, 28 Dec 1970, *Bisse HFC-15640* (HAJB); Consolación del Norte, Pan de Guajaibón, 14 Oct 1976, *Bisse et al. HFC-32501* (HAJB); segunda mitad del Pan de Guajaibón, 14 Apr 1980, *Herrera et al. SV-29487* (HAC); *ibid.*, *Herrera et al. SV-29488* (HAC); Guajaibón, 4 Nov 1860–1864 [probably 1862], *Wright 1222 p.p.* (CAS on-line image, GH, MO, P on-line image, S).

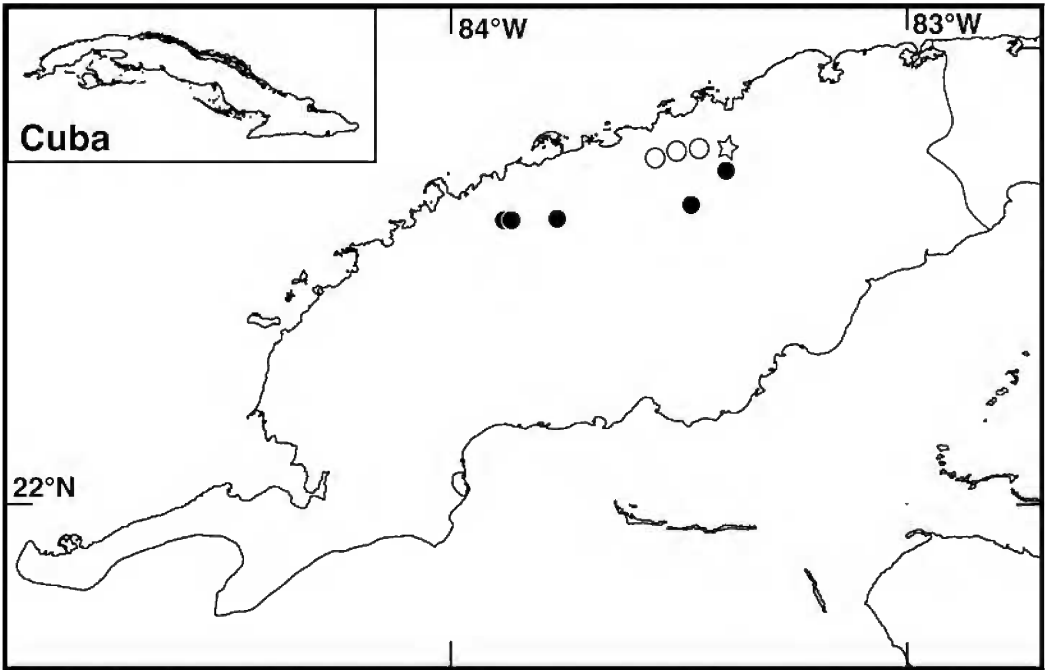


Fig. 5. Distribution of *Miconia guajaibonensis* (star), *M. impressa* (closed circles), and *M. cajalbanensis* (open circles) in western Cuba.

Few collections of this rare and geographically restricted species are known, and *Miconia guajaibonensis* is morphologically quite uniform, although it seems to vary in the development of mite domatia, as in the western Cuban populations of *Miconia bicolor*. These two species likely are closely related, as both are characterized by an indumentum of stellate-peltate scales on the abaxial leaf surface; see key for their differentiating characteristics.

The new name, *Miconia guajaibonensis*, is needed because the epithet “lanceolata” is occupied in *Miconia*, i.e., *M. lanceolata* DC. The new epithet highlights the only known locality at which this rare (and possibly endangered) species occurs. Currently, six species, including *M. guajaibonensis*, are known to be endemic to Pan de Guajabón (Borhidi & Muñoz 1985; Borhidi 1991; Judd et al. 2008; Morejón & Sanchez 2012).

4. *Miconia impressa* (Urb.) Judd, Bécquer, & Majure, comb. nov. (Fig. 3E). *Tetrazygia impressa* Urb., Repert. Spec. Nov. Regni Veg. 22:225. 1926. TYPE: CUBA. Prov. Pinar del Río: Sierra de los Órganos, Grupo del Rosario, Sierra de Pendejeral, on top of the ridge, 14 Sep 1923, fl, fr, E.L. Ekman 17539 (LECTOTYPE: SI, here designated, because specimen at B destroyed; ISOLECTOTYPE: NY!, fragment).

Tetrazygia versicolor Urb., Repert. Spec. Nov. Regni Veg. 22:224. 1926. TYPE: CUBA. Prov. Pinar del Río: Sierra del Sitio Santo Tomás, steep limestone cliffs, 500 m, 10 Jun 1923, fl, E.L. Ekman 16625 (LECTOTYPE: SI, here designated, because specimen at B destroyed; ISOLECTOTYPE: US, on-line image #00120756!).

Tetrazygia minor Urb., Repert. Spec. Nov. Regni Veg. 22:224. 1926. *Tetrazygia lanceolata* Urb. subsp. *minor* (Urb.) Borhidi, Acta Bot. Acad. Sci. Hung. 23:79. 1977 [1978]. TYPE: CUBA. Prov. Pinar del Río: San Diego de los Baños, at the foot of Sierra de la Guira, 24 Oct 1923, sterile, E.L. Ekman 17785 (LECTOTYPE: S on-line image #05-3527!, here designated, because specimen at B destroyed; ISOLECTOTYPE: NY!, fragment, on-line image #00099743).

Evergreen **shrub** up to ca. 3 m. Young **stems** terete to slightly quadrangular, the indumentum of dense, matted, pale ferruginous, stellate to dendritic hairs, becoming only sparse with age, without elongate, multicellular, non-glandular hairs, internodes 0.5–4.2 cm long, lacking longitudinal ridges, nodal line absent or present, faint. **Leaves** isophyllous or nearly so; petiole 0.7–3.7 cm long, the indumentum of dense, stellate to dendritic

hairs; the blade 2.1–9.7 × 0.8–3.6 cm, ovate to elliptic, not falcate, chartaceous to thinly coriaceous, the apex acute to acuminate, the base obtuse to rounded or slightly cordate, the margin plane to slightly revolute, entire; secondary veins in two pairs, one pair conspicuous and one pair inconspicuous, acrodromous, basal, the innermost pair joining midvein at base to 1.5 mm above the leaf base, the conspicuous secondary veins placed 1.3–6 mm in from margin, the inconspicuous secondary veins intramarginal to 1 mm in from margin, tertiary veins percurrent, oriented subperpendicular to midvein, 1–5.5 mm apart, connected by a single quaternary vein, or quaternary veins reticulate, not connecting tertiary veins, the higher order veins reticulate, the midvein and major secondary veins moderately to slightly impressed (occasionally flat), tertiary veins slightly impressed to flat, remaining veins flat on adaxial surface; the midvein strongly raised, the major secondary veins moderately to slightly raised, the minor secondary veins and tertiary veins slightly raised to flat, and the higher order veins flat on abaxial surface; adaxial surface appearing slightly wrinkled after drying, with scattered druse crystals, and drying darker than the abaxial surface, the indumentum initially of dense, white to very pale ferruginous, globular stellate to stellate hairs, but very quickly glabrescent, although sometimes a few hairs remaining on proximal portion of midvein; abaxial surface pale green, the surface smooth to very slightly bullate, with ± dense, white to very pale ferruginous, stellate hairs, usually 0.12–0.24 mm across, the veins with dense, similar hairs, such hairs on lamina and veins persistent to rarely somewhat deciduous; mite domatia usually present at junction of midvein and major secondary veins, at least on some leaves of each shoot, but sometimes such domatia absent, when present well to poorly developed, composed of elongate, multicellular, eglandular, pale yellow to ferruginous, barbate hairs, 0.2–1 mm long. **Inflorescences** terminal, paniculate cymes, 4–8.5 cm long, 2.5–4.5 cm across, with 2–4 major branch pairs, the peduncle 1–5 cm long, the ultimate axes (pseudopedicels) 1–4 mm long, and the numerous flowers well separated from each other; bracts quickly deciduous, not seen, probably ± triangular; bracteoles 0.5–1.2 × 0.15–0.2 mm, narrowly triangular, with acute apex, deciduous. **Flowers** 5-merous, zygomorphic (due to positioning of the stamens), with pedicel 0.5–1.5 mm long. **Hypanthium** 5–6 mm long, terete and not to only slightly constricted above ovary, the free portion 2.5–2.7 mm long, 1.5–2.5 mm wide at the torus, the outer surface with ± dense stellate hairs, the internal surface smooth to very slightly longitudinally ridged, glabrous. **Calyx** lobes 5, fused in bud as a conical calyptra, but with a minute, apical opening, the tube 1.4–1.6 mm long, consistently and usually regularly tearing, with calyptra-like remnants consisting of 2 or 3 lobes, occasionally tearing more regularly between lobes, and at anthesis the tube thus appearing only ca. 0.5 mm long, with moderate to dense stellate hairs abaxially, and sparse to moderate branched to stellate hairs adaxially, the lobes 0.3–0.6 × 0.15–0.5 mm, ± triangular (but actual calyx lobes not evident at anthesis, appearing as a small apiculum at apex of torn, irregular to ± triangular pseudo-lobes), the apex acute, with hairs similar to those of the tube, green; calyx teeth present, 0.1–0.2 mm long, represented merely by an ellipsoidal bump, nearly filling each of the reduced calyx lobes, green, with rounded apex, and hairs similar to those of calyx. **Petals** 5, 4.5–6 × ca. 3.5–4.2 mm [but possibly larger, as values based on slightly immature flower and original description], asymmetrically obovate, spreading to reflexed, white, glabrous but both surfaces densely papillose-granulate, the apex rounded, slightly notched, the base slightly narrowed to a broad attachment, the margin entire. **Stamens** 10, isomorphic, ± geniculate near filament apex; staminal filament 3.5–6 mm long [measurements based on slightly immature flower and original description], glabrous, white, anther thecae 4.5–6 × 0.8–1 mm, subulate, straight to slightly incurved, opening by a small dorso-apical pore, yellow, the connective not prolonged below the thecae, glabrous, but the filament emerging from slight depression in sterile, minutely dorso-lobed anther base. **Ovary** 3-locular, ca. 3/4 inferior, ± ellipsoid, 2–4.5 mm long, 1.5–2.5 mm in diameter, apically cylindrical-conic, glabrous, the apex with small slightly ridged collar but lacking crown, with axile placentation, the ovules numerous, borne on a small placenta that extends only slightly into locule; style 9–11 mm long, nearly straight to distally curved, white to pink, glabrous; stigma punctate, minutely papillose, ca. 0.15 mm wide. **Berries** 4–8.5 mm long, not including the persistent hypanthium and calyx, 3.5–7 mm in diameter, globose, subglobose, or ellipsoid, purple-black, with scattered stellate hairs, the hypanthium constricted, 1.3–2.5 mm wide at narrowest point and 1.7–3.5 mm wide at torus, but appearing strongly constricted due to expanded calyx tube. **Seeds** 1–1.7 mm long, angular-obovoid, with ± rectangular raphe, the testa ± smooth; appendage absent.

Phenology.—Collected in flower in June, July and September.

Distribution and habitat.—*Miconia impressa* is endemic to Pinar del Río, in western Cuba (Fig. 5), occurring from 500–614 m in thickets over limestone.

Additional specimens examined. **CUBA. Prov. Pinar del Río:** Viñales, cresta del mogote al O del sendero Cocco Solo-Palmarito, 22°37.409N, 83°43.282W, 377 m, 21 Jul 2013, *Barrios et al.* (HAJB); Baños San Vicente, rocky limestone hill, 12–16 Sep 1910, *N.L. Britton et al.* 7464 (NY, US); sierra Sitio del Infierno, base S, ascenso y cima del mogote de El Americano, cumbre más alta, 614 m, 22 Jul 1991, *Sanchez HFC-69824* (HAJB); mogote de Dos Hermanas, Viñales, 7 Oct 1989, *Urquiola et al.* HPR-5629 (HAJB, HPPR); cima de la Sierra del Infierno, Viñales, 4 Jul 1990, *Urquiola et al.* HPR-6004 (HAJB, HPPR); without definite locality, *Wright s.n.* (GH, NY).

Miconia impressa is distinctive, and separable from other species of the *M. bicolor* complex, because of its flower buds that have a nearly closed (apically), conical calyptra (formed from the calyx tube), so the petals are hidden in bud (although minute, free calyx lobes are still present at the apex of the calyptra). As the flowers mature, the calyx tube usually tears completely and irregularly as a calyptra (of one or two pieces, each formed by fused lobes) or occasionally into more or less regular “lobes,” allowing the petals and stamens to emerge. It is also distinctive in having leaves with a dense, abaxial indumentum of more or less white, stellate hairs (see key). The species is somewhat variable in leaf size, the impression of the veins adaxially, and in the presence, and prominence of mite domatia. Thus, *Tetrazygia versicolor* and *T. minor* are here considered within the circumscription of *M. impressa*.

5. *Miconia barbata* (Borhidi) Judd, Bécquer, & Majure, comb. nov. (**Fig. 6A**). *Tetrazygia barbata* Borhidi, Acta. Bot. Acad. Sci. Hung. 23:38. 1977 [1978]. TYPE: CUBA. Prov. Oriente [Holguín]: Playa de Moa, 25 Jul 1941, *Bro. León LS-20286*, with *Bro. Clemente*, & *R. Howard* (HOLOTYPE: HAC!; ISOTYPES: NY!, HAC!).

Evergreen **shrub** or tree to 5.5 m. Young **stems** terete to slightly quadrangular, the indumentum of dense, brunnescent to pale ferruginous, stellate, globular-stellate to dendritic hairs, without elongate, multicellular, non-glandular hairs, internodes 0.7–8 cm long, lacking longitudinal ridges, nodal line present, faint. **Leaves** isophyllous or nearly so; petiole 1.6–3 cm long, the indumentum of brunnescent to ± ferruginous, globular-stellate to stellate hairs to stellate-peltate scales with ± free arms; the blade 4.5–19 × 1.6–5.6 cm, ovate to elliptic or oblong, ± falcate, chartaceous to thinly coriaceous, the apex acuminate to attenuate, the base obtuse to rounded, the margin plane to slightly revolute, entire to slightly undulate; secondary veins 2 pairs, one pair conspicuous and one pair inconspicuous, acrodromous, basal, the innermost pair joining midvein at base to 4 mm above the leaf base, the conspicuous secondary veins placed 1.7–11 mm in from margin, the inconspicuous secondary veins intramarginal to 2.3 mm in from margin, tertiary veins percurrent, oriented subperpendicular to midvein, 1.5–9 mm apart, connected by 1 or 2 quaternary veins, or such veins ± reticulate and not connecting the tertiaries, the higher order veins reticulate, the midvein and major secondary veins slightly impressed, tertiary veins slightly impressed to flat, remaining veins flat on adaxial surface; the midvein strongly raised, the major secondary veins moderately to slightly raised, the minor secondary veins and tertiary veins slightly raised to flat, and the higher order veins flat on abaxial surface; adaxial surface appearing slightly wrinkled after drying, with scattered druse crystals, and drying darker than the abaxial surface, the indumentum initially of ± dense, brunnescent to pale ferruginous, globular-stellate hairs and stellate-peltate scales with ± free arms, but very quickly glabrescent, although sometimes a few hairs persistent on proximal portion of midvein; abaxial surface pale green but ± brunnescent due to indumentum, the surface smooth to bullate, with moderate to dense, brunnescent to pale ferruginous, globular-stellate hairs and stellate-peltate scales with ± free arms, 0.13–0.24 mm across, the veins with similar hairs, such hairs on lamina persistent to partly deciduous and those on the veins also persistent to deciduous, especially on midvein and major secondary veins, but occasionally also on tertiary veins; mite domatia well-developed (i.e., to 11 mm in length), consistently present, at junction of midvein and major secondary veins, sometimes also at junction of midvein and tertiary veins, and formed by tuft or ± dense mass of elongate, barbate, pale yellow to ferruginous, eglandular hairs, from 0.2–1.7 mm long. **Inflorescences** terminal, paniculate cymes, 6–16 cm long, 3.5–11 cm across, with 3–5 major branch pairs, the peduncle 1.4–5 cm long, the ultimate axes (pseudopedicels) 1–4.5 mm long, and the numerous flowers well separated from each other; bracts 0.5–1 × 0.2–0.3 mm, but probably also larger,

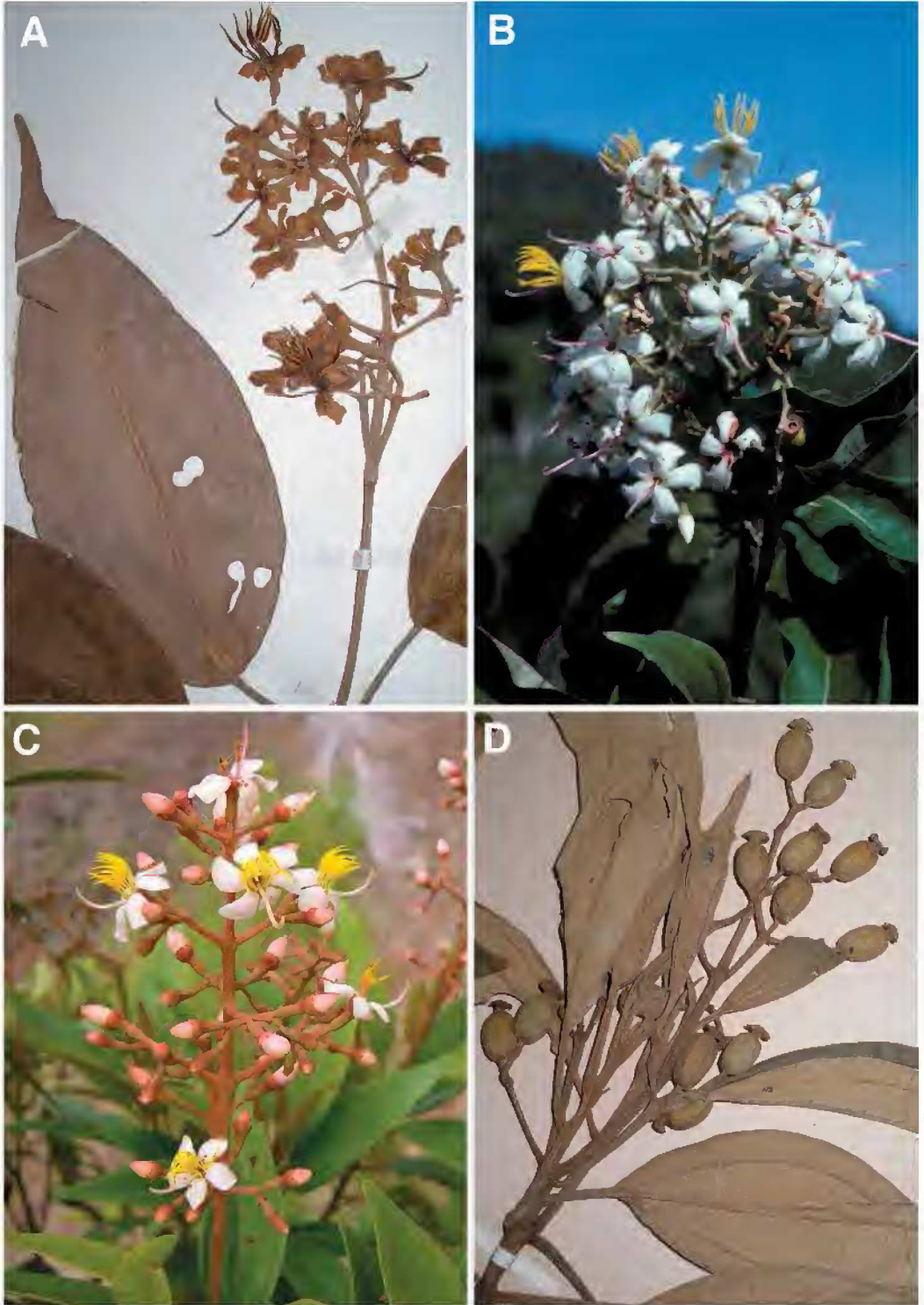


FIG. 6. **A.** *Miconia barbata* (Ekman 9484). **B.** *M. angustiflora* (Judd 5302). **C.** *M. cajalbanensis* (Bécquer & Abbott 82423). **D.** *M. maestrensis* (Ekman 14920).

narrowly triangular to triangular, the apex acute, quickly deciduous; bracteoles 0.3–0.5 × 0.1–0.3 mm, narrowly triangular to triangular, with acute apex, deciduous. **Flowers** 5- or occasionally 6-merous, zygomorphic (due to positioning of the stamens), with pedicel 1–2.5 mm long. **Hypanthium** 4.5–7.5 mm long, terete and slightly constricted above ovary, the free portion 2.5–4 mm long, 2–2.7 mm wide at the torus, the outer surface with moderate to dense stellate hairs, the internal surface smooth to very slightly longitudinally ridged, glabrous. **Calyx** lobes 5 (6), separate in bud, the tube 0.8–2.3 mm long, usually not tearing between lobes, with moderate to dense stellate hairs abaxially, with moderate to dense branched to stellate hairs adaxially, the lobes 0.3–1.5 × 1.5–3 mm, triangular to broadly triangular, the apex acute to obtuse or rounded, with hairs similar to those of the tube, green, sometimes red-tinged; calyx teeth present, 0.1–0.15 mm long, merely a small bump near apex of lobe, green, with rounded apex, and hairs similar to those of calyx. **Petals** 5 (6), 6–8.5 × 3.5–5.5 mm, asymmetrically obovate, spreading, white (but pink-tinged with age), glabrous but both surfaces densely papillose-granulate, the apex ± rounded, sometimes obscurely notched, the base slightly narrowed to a broad attachment, the margin entire. **Stamens** 10 (12), isomorphic, ± geniculate near filament apex; staminal filament 5.3–7 mm long, glabrous, pale yellow, anther thecae 5–7.7 × 0.9–1.2 mm, subulate, straight to slightly incurved, opening by a small dorso-apical pore, yellow, the connective not prolonged below the thecae, glabrous, but the filament emerging from slight depression in sterile, minutely dorso-lobed anther base. **Ovary** 3-locular, ca. 3/4 inferior, ellipsoid to ± oblong, apically conical, glabrous, the apex with a small, slightly ridged collar but lacking a crown, with axile placentation, the ovules numerous, borne on small placenta not or only slightly extending into locule; style 10–15 mm long, distally curved, white (but pink-tinged with age), glabrous; stigma punctate, minutely papillose, ca. 0.15 mm wide. **Berries** 6–13 mm long, 4–10 mm in diameter, ellipsoid to nearly globose, purple-black, with scattered, stellate hairs, the hypanthium constricted, 1.5–2.5 mm wide at narrowest point and 2–3 mm wide at torus, but appearing strongly constricted due to flaring calyx tube. **Seeds** 1–2 mm long, angular-obovoid, with ± rectangular raphe, the testa slightly to distinctly roughened due to bulging cells, except on distal surface where ± smooth, the raphe also smooth; appendage absent.

Phenology.—Recording in flower in March (and likely also April), July, August, October, and December, and probably flowering year around.

Distribution and habitat.—*Miconia barbata* is restricted to the central and northern “Oriente” region, mainly in Prov. Guantánamo and Holguín, Cuba, occurring in the Sierra de Nipe, mountains near Bayate, Monte Verde, and in the vicinity of Moa and Baracoa (Fig. 7), from near sea-level to 745 m, in pinelands, thickets, forests along arroyos, and semideciduous forests on limestone.

Additional specimens examined: **CUBA. Prov. Guantánamo:** prope Bayate, Sabana Miranda, 11 July 1914, *Ekman 1946* (NY, S) Bayate, Cayo del Rey, 21 Feb 1915, *Ekman 4694* (S); Charrascal de la Cuaba, Baracoa, 12 Apr 1969, *L. Figueiras UO-778* (HAJB); Baracoa, Taco Bay, camino de Yamanigüey, 12 Apr 1960, *L. Figueiras UO-778* (HAC); *ibid.*, 24 Jul 1969, *L. Figueiras UO-2166* (HAC, HAJB); Baracoa, Camino Alto La torre, Nibujón, SE de Taco Bay, 20° 30'1.8" N, 74° 39'43.2" W, 150 m, 23 Oct 2009, *Michelangeli et al. 1504* (FLAS); Monte Verde, La Perla, 4 May, 2 Jul, 1859–1864, *Wright 1222 p.p.* (CAS on-line image, MO, P on-line image). **Prov. Holguín:** Sierra de Nipe, loma al S de la Unidad Silvícola Forestal “Pinal Redondo,” cerca del arroyo La Chivera, 480 m, 25 Apr 2004, *Bécquer HFC-82254* (FLAS, HAJB); Moa, Río Quesigua, donde cruza la carretera de Moa-Baracoa, 5–10 m, 27 Mar 2009, *Bécquer et al. HFC-85468* (HAJB); Sierra de Nipe, orillas del río Piloto, cerca de las cabezadas, Apr 1968, *Bisse & Köhler HFC-8529* (HAJB); Cuevas de Purnio, 5 Nov 1971, *Bisse et al. HFC-20767* (HAJB); Moa, Los Farallones de Moa, 300 m, 31 Mar 1972, *Bisse & Berazáin HFC-22229* (HAJB); Mayarí Abajo, Sierra de Nipe, orillas de arroyos en el camino a Woodfred, 600 m, 2 Jun 1979, *Bisse et al. HFC-36020* (HAJB); Moa, Monte la Breña alrededores del campamento Los Carboneros camino hacia el río Yagrumaje, 300 m, 17 Apr 1981, *Bisse et al. HFC-44469* (HAJB); Mayarí, Pinares de Mayarí, cerca del campamento de pineros en el valle superior del río Piloto, 400 m, 31 May 1983, *Bisse et al. HFC-50610* (HAJB); Moa, Cerro de la Embocadura del río Yamanigüey, 24 Mar 1970, *Borhidi et al. SV-27946* (HAC); *ibid.*, *Borhidi et al. SV-27947* (HAC); Moa, Dec 1939, *Mrs. Bucher 144* (HAC, NY); Moa, *Bucher SV-11442* (HAC); Sierra de Nipe, El Taller (ad Río Piloto), 21 Jul 1914, *Ekman 2089* (S, US); Sierra de Nipe, ad Río Piloto, 5 Oct 1919, *Ekman 9684* (NY, S, US); Pinares de Mayarí, Sierra de Nipe, 27–31 May 1960, *L. Figueiras UO-952* (HAC, HAJB); Moa, camino a mina Mercedita, 16 Mar 2000, *Fritsch et al. SV-41362* (HAC); 5 km S of Woodfred, Sierra de Nipe, Jul 1941, *Howard 6149* (GH, MO, NY); Moa, 30 Jul or 3 Aug 1945, *Bro. León et al. LS-22506* (GH, HAC, HAJB); Charrasco de la Cueva, Sierra de Nipe, 700 m, 27 Jul 1940, *Bros. León & Alain 19256* (NY); Moa, Charrascal 1.5 km al E de Yamanigüey, carretera Moa-Baracoa, 20°34'22.8"N, 74°44'46.2"W, 10 m, 26 Oct 2009, *Michelangeli et al. 1539* (FLAS, HAJB, NY); Mayarí, via Cayo Mujeres, 3 km al N y luego 1 km al O por la carretera desde el Hotel Pinares de Mayarí, 20°31'39.6"N, 75°45'34.8"W, 745 m, *Michelangeli et al. 1559* (FLAS, HAJB, NY); crest of Sierra Nipe, 600–700 m, 16–17 Oct 1941, *Morton & Acuna 3044* (DUKE, F, FLAS, FTG, MO, NY, US); Sierra Nipe, near Woodfred, 500–650 m, 4 Dec 1909, *Shafer 2975* (NY); near base of Loma Mensura, 680 m, 1–3 Feb 1910, *Shafer 3765* (NY, US).

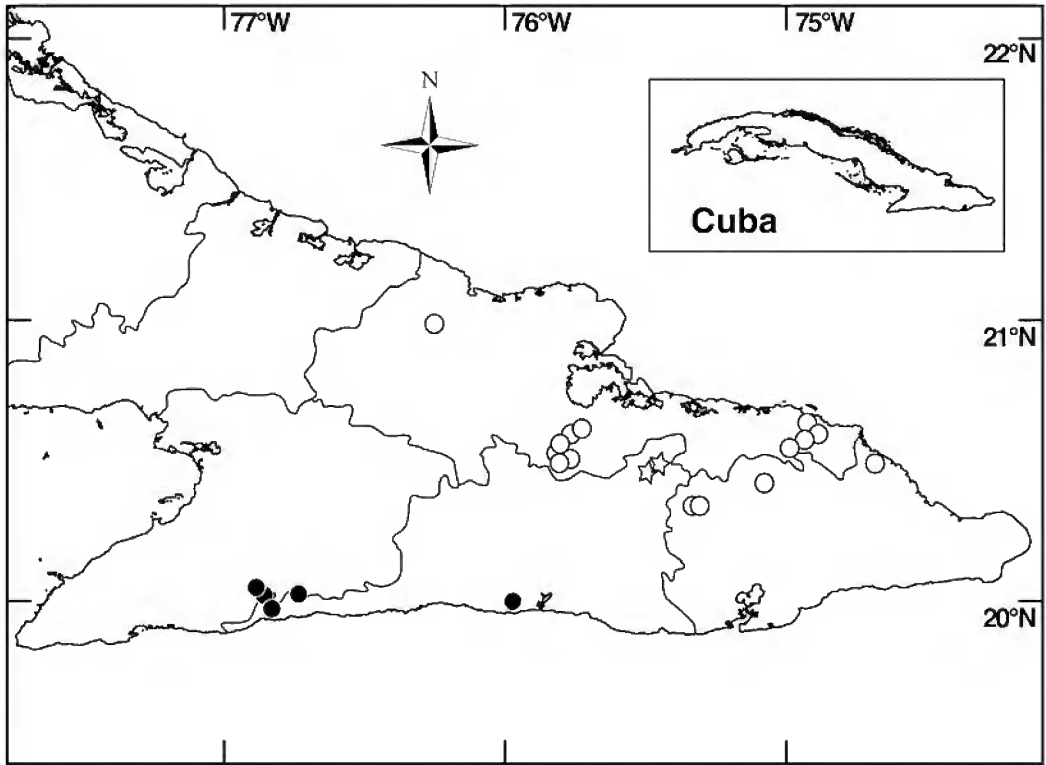


Fig. 7. Distribution of *Miconia barbata* (open circles), *M. cristalensis* (stars), and *M. maestrensis* (closed circles) in eastern Cuba.

Miconia barbata shows some geographically correlated variation, with plants of the Sierra de Neiba often having a denser abaxial leaf indumentum than those of other regions; additionally, the plants of the Moa region have abaxial epidermal cells that are more clearly bullate (and their abaxial epidermis is clearly visible, because many of the stellate hairs are deciduous on older leaves).

The species often has been confused with *Miconia bicolor* (see specimen annotations) even though it is readily distinguished by the indumentum of the abaxial leaf surface, i.e., with stellate hairs or stellate-peltate scales with largely free arms in *M. barbata* and with stellate-peltate scales (i.e., the arms usually strongly fused) in *M. bicolor* (see also Borhidi, 1978, who described the indumentum of *M. barbata* as radiate scales). Abaxial mite domatia are consistently present in *M. barbata* (although they range from prominent to occasionally more or less inconspicuous), while they may or may not occur in *M. bicolor*. The two species are partly geographically isolated (Figs. 4, 7) but likely co-occur (more field work is needed in the “Oriente” region). *Miconia barbata* is actually much more difficult to distinguish from *M. angustiflora*, a Jamaican endemic, which has less well developed mite domatia (and frequently entirely lacks such domatia; see key).

6. *Miconia angustiflora* (Benth.) Naudin, Ann. Sci. Nat. Bot. sér. 3, 16:246. 1850. (Fig. 6B). *Diplochita angustiflora* Benth., Pl. Hartw. 263. 1846. *Tetrazygia angustiflora* (Benth.) Griseb., Goett. Abh. 9:53. 1861. TYPE: JAMAICA: Stony Hill (not seen).

Tetrazygia ovata Cogn., Symb. Antill. 5(3):447. 1908. TYPE: JAMAICA. [St. Catherine Parish]: Holly Mount, prope Ewarton, 867 m, 2600 ft, 11 Aug 1896, fl. W. Harris 6450 (HOLOTYPE: B, destroyed; ISOTYPES: F!, NY!, 2 sheets, on-line images #00099744 and 00099745!).

Evergreen **shrub or tree** to 10 (–15) m. Young **stems** terete to slightly quadrangular, the indumentum of dense, ferruginous to pale ferruginous, stellate to globular-stellate hairs, without elongate, multicellular, non-glandular hairs, internodes 0.5–11.3 cm long, lacking longitudinal ridges, nodal line present, faint. **Leaves** isophyl-

lous or nearly so; petiole 1.3–6.6 cm long, the indumentum of dense to moderate, stellate hairs; the blade 5.3–20 × 1.8–8.3 cm, ovate to elliptic or obovate, falcate or not, coriaceous, the apex acuminate to attenuate, the base narrowly cuneate or acute to obtuse or rounded, the margin plane to slightly revolute, entire to slightly undulate; secondary veins 2 pairs, one pair conspicuous and one pair inconspicuous, acrodromous, basal, the innermost pair joining midvein at base to 10 mm above the leaf base, the conspicuous secondary veins placed 3–13 mm in from margin, the inconspicuous secondary veins intramarginal to 3 mm in from margin, tertiary veins percurrent, oriented subperpendicular to midvein, 2–9 mm apart, connected by 1–3 quaternary veins, or not connected and quaternary veins reticulate, the higher order veins reticulate, the midvein and major secondary veins slightly impressed to flat, tertiary veins slightly impressed to more commonly flat, remaining veins flat on adaxial surface; the midvein strongly raised, the major secondary veins slightly to moderately raised, the minor secondary veins and tertiary veins slightly raised to flat, and the higher order veins flat on abaxial surface; adaxial surface appearing smooth and punctate to slightly wrinkled after drying, with scattered druse crystals, and drying darker than the abaxial surface, the indumentum initially of dense, pale ferruginous, stellate hairs, but very quickly glabrescent, although scattered hairs often retained on lamina, and numerous hairs often retained on midvein and major secondary veins; abaxial surface pale green, the surface ± smooth, with dense to moderate (rarely sparse), ferruginous to pale ferruginous, stellate hairs (with arms predominantly radiating outward), 0.13–0.25 mm across, the veins with similar hairs, such hairs on lamina usually ± persistent, and those of primary, secondary, and even tertiary veins often deciduous (but sometimes persistent as well), mite domatia present or absent, usually not well developed, at junction of midvein and major secondary veins, with elongate, ± ferruginous, barbate, eglandular hairs, 0.1–1 mm long. **Inflorescences** terminal, paniculate cymes, 5–22 cm long, 4–13 cm across, with 3–7 major branch pairs, the peduncle 1–6.6 cm long, the ultimate axes (pseudopedicels) 1–7 mm long, and the numerous flowers well separated from each other; bracts 0.7–1.5 × 0.2–0.3 mm, but probably also larger, narrowly triangular, with acute apex, quickly deciduous; bracteoles 0.4–1 × 0.1–0.25 mm, narrowly triangular, with acute apex, deciduous. **Flowers** 5- or occasionally 6-merous, zygomorphic (due to positioning of the stamens), with pedicel 1.5–6 mm long. **Hypanthium** 4.5–6 mm long, terete and slightly constricted above ovary, the free portion 2.5–3.5 mm long, 2–3 mm wide at the torus, the outer surface with moderate to dense stellate hairs, the internal surface smooth to very slightly longitudinally ridged, glabrous. **Calyx** lobes 5 (6), separate in bud, the tube 0.8–1.5 mm long, not tearing between lobes, with moderate to dense stellate hairs abaxially, with sparse to moderate branched to stellate hairs adaxially, the lobes 0.2–0.8 × 2–3.5 mm, broadly triangular to nearly obsolete, the apex obtuse to rounded, with hairs similar to those of the tube, green, sometimes red-tinged; calyx teeth present, 0.1–0.2 mm long, a small bump near apex of each lobe, green, with rounded apex, and hairs similar to those of calyx. **Petals** 5 (6), 7–11 × 3.5–6.5 mm, asymmetrically obovoid, spreading, white, glabrous but both surfaces densely papillose-granulate, the apex rounded and ± notched, the base slightly narrowed to a broad attachment, the margin entire. **Stamens** 10 (12), isomorphic, ± geniculate near filament apex; staminal filament 5.5–8 mm long, glabrous, pale yellow, anther thecae 5.2–7.9 × 0.8–1.2 mm, subulate, straight to slightly incurved, opening by a small dorso-apical pore, yellow, the connective not prolonged below the thecae, glabrous, but the filament emerging from slight depression in sterile, minutely dorso-lobed anther base. **Ovary** 3-locular, 3/4–4/5 inferior, ellipsoid to oblong, 4–4.5 mm long, 1.7–3 mm in diameter, apically conical, glabrous, the apex with small, ridged collar, but lacking crown, with axile placentation, the ovules numerous, borne on small placenta that only slightly extends into locule; style 12–18.5 mm long, distally curved, white to rose, glabrous; stigma punctate, minutely papillose, 0.15–0.2 mm wide. **Berries** 6–10 mm long, 5.5–10 mm in diameter, globose to ellipsoid, purple-black, with scattered, stellate hairs, the hypanthium constricted, 1.5–2.7 mm wide at narrowest point and 2.5–3.3 mm wide at torus, but appearing strongly constricted due to flaring calyx tube. **Seeds** 1–2 mm long, angular-obovoid, with ± rectangular raphe, the testa smooth to ± roughened due to bulging cells, but the raphe smooth; appendage absent.

Chromosome number.— $2n = 34$ (Wurdack & Solt 1980).

Phenology.—Recorded in flower in every month except April, October, and December, and likely blooming year around.

Distribution and habitat.—*Miconia angustiflora* is endemic to Jamaica, occurring nearly throughout the island (Fig. 8), usually in dry to moist thickets or forests over limestone, from 90–900 m.

Additional specimens examined. **JAMAICA. Clarendon Parish:** between Lluidas Vale and Croft Hill, 520 m, 16 Jul 1962, *Fosberg 42715* (US); Peckham woods, 2500 ft, 6 Jul 1911, *Harris 10961* (NY, US); *ibid.*, 27 Sep 1912, *Harris 11176* (F, NY, US). **Hanover Parish:** Campbellton Hall, 300–400 ft, 22 Dec 1960, *Adams 8649* (MO); Green Island and vicinity, Fish River Mountains, 13–15 Mar 1908, *N.L. Britton & Hollick 2165* (NY); Hopewell, 500 ft, 26 Jun 1975, *Clarkson & Kress 75-123* (DUKE); Askenish, Dolphin Head, 29 Jun 1975, *Clarkson et al. 75-142* (DUKE); NE of Dolphin Head, 20 Mar 1908, *Harris 10316* (F, NY, US); Dolphin Head, SW of Askenish, ca. 7 mi S of Lucea, 270–300 m, 12 May 1987, *Judd 5302* (F, FLAS, GH, IJ, MO); Dolphin Head, E side, 1200 ft, 22 Aug 1952, *Proctor 7184* (IJ); lower slopes between Askenish and Dolphin Head, 900–1250 ft, 28 Jun 2001, *Proctor 51899* (IJ); Dolphin Head, on the top, 535 m, 9 Jul 1986, *Skean 1841* (IJ, NY); NE slopes of Dolphin Head, 330 m, 9 Jul 1986, *Skean 1854* (IJ, MO, US); Quashiba Mountain, 1 mi W of Georges Plain, 1100–1300 ft, 29 Jul 1954, *Webster & Wilson 5092* (IJ, MICH, S, US). **Manchester Parish:** Lincoln, 3–7 Sep 1908, *N.L. Britton 3108* (NY); Marshall's Pen, 21–23 Sep 1908, *N.L. Britton 3704* (NY); vicinity of Mandeville, 15–26 Feb 1910, *Brown 266* (NY, US); Limestone Hill at Banana Ground, 2900 ft, 14 Jul 1963, *Crosby et al. 656* (DUKE, F, MICH, MO, MSC, NY); near Troy, 2000 ft, 30 Jun 1904, *Harris 8744* (F, FLAS, NY, S, US); 0.5 mi NW of Christiana, 3000 ft, 3 Jul 1955, *Howard & Proctor 14341* (A, IJ); 2.25 mi NW of Mandeville, Marshall's Pen, 18°5'N, 77°30'W, 700 m, 1 Jun 1983, *Landrum 4745* (NY); Mandeville, Marshall's Pen, 750 m, 19 Nov 2000, *Parker & Proctor 3447* (IJ); 0.5 mi NW of Christiana, 3000 ft, 22 Oct 1955, *Proctor 11040* (IJ, NY, US); Marshall's Pen, 2.25 mi NW of Mandeville, 2100–2300 ft, 28 Jul 1968, *Proctor 28893* (IJ, NY, US); Cross Keys, 2000–3000 ft, Aug 1954, *Robertson 1249* (NY). **Portland Parish:** slopes above Uncommon Hill, above Fruitful Vale, 1000–2250 ft, 17 Aug 1962, *Proctor 22615* (IJ, MICH, NY). **St. Andrew Parish:** Red Hills, 1500 ft, 7 July 1960, *Adams 7525* (DUKE); Mona Hill, vicinity of Kingston, 11–12 Sep 1906, *N.L. Britton 366* (NY); Cooper's Hill, Red Hills, NW of Kingston, 2300 ft, 7 Aug 1963, *Crosby & Anderson 1117* (DUKE, F, MICH, MSC, NY); Stony Hill, Nov 1898, *Fawcett & Harris 7462* (A, GH, NY, S, US); Halls Delight, 334 m, 15 Jun 1895, *Harris 5512* (F, US); Constant Spring to Bardowie, 800 ft, 27 Jul 1915, *Harris 12089* (F, GH, MO, NY, S, US); between Mavis Bank and Gordon Town, between mile marker 13 and 14, 760 m, 18 May 1987, *Judd 5363* (IJ); Hermitage Dam and vicinity, 500 m, 3 Jun 1926, *Maxon 8787* (GH, S, US); Stony Hill, 19 Jul 1949, *Newill s.n.* (IJ); *ibid.*, 1500 ft, 14 Jul 1952, *Newill s.n.* (IJ). **St. Ann Parish:** 1 mi S of Crescent Park, vicinity of Lydford Post Office, 1750 ft, 20–31 Dec 1953, *Howard & Proctor 13548* (A, IJ); Hopewell, 2 Feb 1938, *Hunnewell 15328* (GH, NY); near Bamboo, 11 Feb 1948, *Hunnewell 18834* (NY); Mount Diablo region, lower slopes of Hollymount, 1 mi S of Faiths Pen, 500–575 m, 28 May 1987, *Judd 5512* (F, FLAS, IJ, NY); vicinity of Lime Hall, 1000–1250 ft, 25 Jun 1954, *Lewis s.n.* (IJ); vicinity of Mosely Hall Cave, near Blackstoned edge, 2000 ft, 24 Aug 1952, *Proctor 7206* (HAC, IJ, NY); rd from Jamaica A-1 to Hollymount on Mt. Diablo, 1700 ft, 6 Jul 1967, *R.E. & S. Weaver 902* (DUKE, GH). **St. Catherine Parish:** on A-1 0.7 mi S of St. Ann/St. Catherine boundary, lower slopes of Mt. Diablo, 18°12.392'N, 77°5.675'W, 526–530 m, *Judd 8309* (FLAS, IJ, NY); 0.6 mi SE of Guys Hill, 1600 ft, 3 May 1952, *Proctor 6653* (IJ, US); 3 mi W of Lluidas Vale, 1750 ft, 11 Jun 1965, *Proctor 26441* (IJ); near Sligoville, 9 Aug 1947, *van der Porten s.n.* (IJ); 1 mi E of Top Hill, 550 m, 10 Oct 1969, *Wurdack & Solt 2616* (NY, US). **St. Elizabeth Parish:** Santa Cruz Mountains, 12 Sep 1907, *N.L. Britton 1296* (NY); Munro College, 2600 ft, Aug 1944, *Snee s.n.* (IJ). **St. Mary Parish:** Cabarita Island, off Port Maria, 150 ft, 29 Dec 1952, *Proctor 7552* (IJ). **St. Thomas Parish:** Serge Island, 15–19 Sep 1908, *N.L. Britton 3655* (NY). **Trelawny Parish:** from Burnt Hill to Ramgoat Cave, 18°25'N, 77°33'W, 500 m, *Acevedo-Rdgz. 9569* (US); Cockpit Country, near Barbecue Bottom, 14 Aug 1963, *Crosby & Anderson 1209* (DUKE, F, GH, MICH, MSC, NY); 2–3 mi N by road of Burnt Hill crossroads, 1300 ft, 16 Aug 1965, *Hespenheide 1289* (DUKE, FLAS, GH, MICH, MO, MSC, NY, US); 0.6–1 mi N of Spring Garden, 1750–2000 ft, 1 Nov 1975, *Proctor 35429* (IJ, MO).

Miconia angustiflora is variable in the development of mite domatia; some individuals have mite domatia on the abaxial leaf surface, while others lack them. The domatia, when present, are usually poorly developed. The species often has been confused with *T. bicolor* (Goldenberg et al. 2013), although the form of the hairs (i.e., stellate hairs vs. stellate-peltate scales) easily differentiate the two taxa. It is actually much more similar to *M. barbata* and *M. maestrensis*, two species of the “Oriente” region of Cuba (see key for differentiating characters), although we note that the latter species also have been confused with *T. bicolor*.

The species has almost always been known as *Tetrazygia pallens* (see, for example, Proctor 1972) although this name actually is a synonym of *T. bicolor* (see Michelangeli & Bécquer 2012, and nomenclatural discussion under *Miconia bicolor*, above). The misapplication of the name *Tetrazygia pallens*, originally described from Hispaniolan material, came about as a result of the broad circumscription of *Tetrazygia pallens* in Cogniaux (1891), which included plants from Jamaica, Hispaniola, and eastern Cuba; the name *T. pallens* was then erroneously applied to the Jamaican populations when the circumscription of this species was restricted.

7. *Miconia cajalbanensis* Judd, Bécquer, & Majure, nom. nov. (Fig. 6C). *Tetrazygia coriacea* Urb., Repert. Spec. Nov. Regni Veg. 22:225. 1926, non *Miconia coriacea* DC., Prodr. 3:189. 1828. TYPE: CUBA [PROV. PINAR DEL RIO]: without definite locality, 1860–1864, fl, *Wright 1222 p.p.* (LECTOTYPE, here designated, because holotype at B destroyed: S!; ISOLECTOTYPES: CAS on-line image #00047931, HAC!, NY!, S!).

Evergreen shrub or tree to 5 m. Young stems terete to slightly quadrangular, the indumentum of dense,

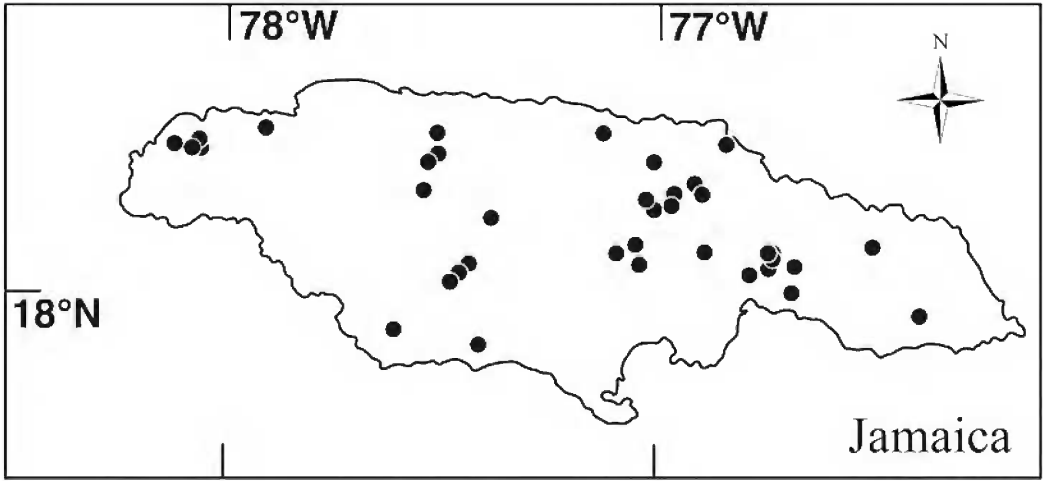


FIG. 8. Distribution of *Miconia angustiflora* in Jamaica.

ferrugineous, stellate hairs, without elongate, multicellular, non-glandular hairs, internodes 0.6–3.3 cm long, lacking longitudinal ridges, nodal line absent. **Leaves** isophyllous or nearly so; petiole 0.7–2.7 cm long, the indumentum of dense, ferrugineous, stellate hairs; the blade 3.4–10 × 1.3–3.5 cm, ovate to elliptic or oblong, not falcate, coriaceous, the apex acuminate, the base obtuse to rounded (or very slightly cordate), the margin plane to revolute, entire; secondary veins 2 pairs, one pair conspicuous and one pair inconspicuous, acrodromous, basal, the innermost pair joining midvein at base to 1 mm above the leaf base, the conspicuous secondary veins placed 1.8–5.5 mm in from margin, the inconspicuous secondary veins intramarginal to 1 mm in from margin, tertiary veins percurrent, oriented subperpendicular to midvein, 1.7–6 mm apart, connected by 1 quaternary vein, or not connected by quaternary veins, and these reticulate, the higher order veins reticulate, the midvein and major secondary veins impressed, tertiary veins very slightly impressed to flat, remaining veins flat on adaxial surface; the midvein strongly raised, the major secondary veins moderately to slightly raised, the minor secondary veins and tertiary veins flat to very slightly raised, and the higher order veins flat on abaxial surface; adaxial surface appearing slightly wrinkled after drying, with scattered druse crystals, and drying darker than the abaxial surface, the indumentum initially of dense, ferrugineous, stellate hairs, but very quickly glabrescent, although a few often persisting on lamina, and numerous such hairs often persisting on primary and secondary veins, especially the proximal portions thereof; abaxial surface pale green but appearing ferrugineous due to the indumentum, the surface distinctly bullate, with moderate to dense, ferrugineous, stellate hairs, 0.07–0.22 mm across, the veins with similar hairs, such hairs on lamina and veins persistent; mite domatia absent. **Inflorescences** terminal, paniculate cymes, 4–15.3 cm long, 4–8 cm across, with 2–5 major branch pairs, the peduncle 1.8–5 cm long, the ultimate axes (pseudopedicels) 1.7–5.5 mm long, and the numerous flowers well separated from each other; bracts 0.5–1.5 × 0.15–0.3 mm, and probably also larger, narrowly triangular, with acute apex, very quickly deciduous; bracteoles 0.3–0.8 × 0.1–0.2 mm, narrowly triangular, with acute apex, quickly deciduous. **Flowers** 5- or occasionally 6-merous, zygomorphic (due to positioning of the stamens), with pedicel 1–3 mm long. **Hypanthium** 6.5–7.5 mm long, terete and not or only slightly constricted above ovary, the free portion 3.5–4.5 mm long, 2.5–4 mm wide at the torus, the outer surface with moderate to dense stellate hairs, the internal surface smooth to very slightly longitudinally ridged, glabrous. **Calyx** lobes 5 (6), separate in bud, the tube 2–3.3 mm long, not tearing between lobes, with moderate stellate hairs abaxially, and moderate to dense branched to stellate hairs adaxially, the lobes 0.2–0.7 × 2–4 mm, broadly triangular to nearly obsolete, the apex rounded, with hairs similar to those of the tube, green, often red-tinged; calyx teeth present, 0.2–0.5 mm long, a rounded to conical bump near apex of each lobe or merely a raised line along

midrib of lobe, green to red, with rounded to acute apex, and hairs similar to those of calyx. **Petals** 5 (6), 9–11 × 4.5–6.5 mm, asymmetrically obovate, spreading, white, often pink-tinged, glabrous but both surfaces densely papillose-granulate, the apex ± rounded, the base slightly narrowed to a broad attachment, the margin entire. **Stamens** 10 (12), isomorphic, ± geniculate near filament apex; staminal filament 7–7.5 mm long, glabrous, pale yellow, often pink-tinged, anther thecae 6.5–8.3 × 0.8–1.3 mm, subulate, straight to slightly incurved, opening by a small dorso-apical pore, yellow, often pink-tinged, the connective not prolonged below the thecae, glabrous, but the filament emerging from slight depression in sterile, minutely dorso-lobed anther base. **Ovary** 3-locular, ca. 3/4 inferior, ellipsoid to oblong, 4.3–5 mm long, 1.7–3 mm in diameter, apically conical or cylindrical-conical, glabrous, the apex with a small, ridged collar, but lacking a crown, with axile placentation, the ovules numerous, borne on a small placenta that only slightly extends into locule; style 15–17 mm long, distally curved, white to pink, glabrous; stigma punctate, minutely papillose, 0.15–0.2 mm wide. **Berries** 5–9.5 mm long, 5.5–8 mm in diameter, globose to ellipsoid, purple-black, with scattered stellate hairs, the hypanthium constricted, 2–2.3 mm wide at narrowest point and 2.5–3 mm wide at torus, but appearing strongly constricted due to flaring calyx tube. **Seeds** 1.3–2 mm long, angular-obovoid, with ± rectangular raphe, the testa distinctly roughened due to bulging cells, except at distal end where cells ± smooth, however, raphe smooth; appendage absent.

Phenology.—Collected in flower from April to July.

Distribution and habitat.—*Miconia cajalbanensis* is endemic to the Cajalbana region, Prov. Pinar del Río, Cuba (Fig. 5), where it occurs in xeromorphic scrub and pinelands on serpentine soil from 150–470 m.

Additional specimens examined: **CUBA. Prov. Pinar del Río:** La Palma, La Cajalbana, 26 Jan 1950, *Acuña H-ROIG-9043* (HAC); La Cajalbana, 10 Jun 1950, *Acuña et al. SV-16187* (HAC); Cajalbana, La Palma, 1 Oct 1949, *Bro. Alain & Acuña 1119* (HAC, NY); Cuabales de Cajalbana, La Palma, 3 Dec 1949, *Bro. Alain & Acuña 1199* (HAC); *ibid.*, *Acuña & Bro. Alain SV-15699* (HAC); W of Loma Cajalbana, La Palma, 3 Apr 1954, *Bro. Alain 3899* (GH, HAC, NY); W of Cajalbana, 7 Dec 1955, *Bro. Alain 4495* (GH, HAC, US); Bahía Honda, Sierra de Cajalbana, subida al Tecnológico Invasión de Occidente, 300 m, 15 Jul 1989, *Álvarez de Zayas & Pujadas HFC-70172* (HAJB); *ibid.*, *Álvarez de Zayas & Pujadas HFC-70175* (HAJB); *ibid.*, *Álvarez de Zayas & Pujadas HFC-70176* (HAJB p.p.); *ibid.*, *Álvarez de Zayas & Pujadas HFC-70177* (HAJB); Cajalbana, Oct 1975, *Armenteros s.n.* (HAJB); Mpio. La Palma, Cajalbana, carretera a Mil Cumbres, sendero ecoturístico, 7 May 2004, *Bécquer & Abbott HFC-82423* (FLAS, HAJB); La Palma, Loma de Cajalbana, falda O, Apr 1967, *Bisse & Rojas HFC-1942* (HAJB); Bahía Honda, parte oriental de la Loma de Cajalbana, Jul 1968, *Bisse HFC-9567* (HAJB); La Palma, pinares de Cajalbana, Oct 1975, *Bisse et al. HFC-28608* (HAJB); La Palma, Cajalbana, 28 Dec 1974, *Bisse et al. HFC-29316* (HAJB); Consolación del Norte, falda S de la loma peluda (Preluda) de Cajalbana, 15 Oct 1976, *Bisse et al. HFC-32604* (HAC, HAJB); La Palma, Altiplano de Cajalbana, cerca del Tecnológico forestal, 350 m, Dec 1980, *Bisse et al. HFC-45507* (HAJB); Loma Cajalbana, pinar de la cumbre, 450–470 m, 5 Jul 1970, *Borhidi & Vásquez 8000 SV-33414* (HAC); *ibid.*, *Borhidi & Vásquez SV-33417* (HAC); La Palma, ladera S de Cajalbana, entre Sagua y El Sitio, 22°45'N, 83°30'W, 150 m, 16 Jul 1996, *Cedeño 1234* (NY); Loma de Cajalbana in “Cuabal”, 10 Mar 1920, *Ekman 10481* (S); Cajalbana, 200–300 m, Nov 1975, *García & Sánchez s.n.* (HAJB); La Palma, Arroyo de Morto, Sierra de Cajalbana, ladera S, 22°46'N, 83°26'W, 14 Sep 1999, *Kuba-Exkursion Uni Frankfurt/M 1999 no. 13* (FR n.v., S); *ibid.*, 17 Sep 1999, *Kuba-Exkursion Uni Frankfurt/M 1999 no. 112* (FR n.v., S); Cajalbana, ladera al NE del Tecnológico Forestal, 400 m, 21 Jan 1981, *Martínez C. SV-36145* (HAC); Monte La Cajalbana, 4 Feb 1956, *Morton 9820* (US); Cajalbana, 1 Nov 1975, *Plasencia s.n.* (HAJB); pinares sobre serpentine de Cajalbana, en la ladera S, 5 May 1988, *Urquiola et al. HPR-4501* (HAJB); La Cajalbana, Jan 1967, *Yero M. 677* (HAC); *ibid.*, Jul 1965, *Yero M. 1093* (HAC).

Miconia cajalbanensis is phenetically distinctive because of its fairly small stellate hairs and distinctly bullate abaxial leaf epidermis (see key). Its seeds are also noteworthy, having bulging testa cells, in contrast to most species of the *M. bicolor* complex, which have more or less smooth testa cells. Despite these distinctive characters, it has frequently been confused with the more widespread and common *M. bicolor*, a species with an abaxial leaf indumentum of stellate-peltate scales.

The new name *M. cajalbanensis*, required since the epithet “coriacea” is occupied in *Miconia*, reflects the fact that this species is endemic to the vicinity of Cajalbana, Cuba. This is a region of exceptional endemism, with ca. 40 endemic species and several endemic genera (Borhidi and Muñiz 1985; Berazaín 1987; Borhidi 1991). *Miconia cajalbanensis* is considered to be critically endangered in Cuba (Berazaín 2005).

8. *Miconia cristalensis* (Borhidi) Judd, Bécquer, & Majure, comb. nov. *Tetrazygia cristalensis* Borhidi, Acta Bot. Acad. Sci. Hung. 23:37. 1977 [1978]. TYPE: CUBA. [PROV. SANTIAGO DE CUBA:] entre Los Mulos y Corea, 2100–2200 ft, Sierra de Cristal, 27–28 Aug 1959, *M. López Figueiras UO-279* (HOLOTYPE: HAC!; ISOTYPES: HAC!, HAJB!, NY!).

Evergreen **shrub to small tree** up to 4 m. Young **stems** terete to quadrangular, the indumentum of dense, ferruginous, globular-stellate to dendritic hairs, without elongate, multicellular, non-glandular hairs, internodes 0.9–3.5 cm long, lacking longitudinal ridges, nodal line present, faint to prominent. **Leaves** isophyllous or nearly so; petiole 1–2.6 cm long, the indumentum of dense, ferruginous, globular-stellate hairs; the blade 4.6–14 × 1.8–4.4 cm, ovate to elliptic, coriaceous, not falcate to slightly falcate, the apex acuminate, the base obtuse to rounded, the margin plane to revolute, entire to slightly undulate; secondary veins two pairs, one pair conspicuous and one pair inconspicuous, acrodromous, basal, the innermost pair joining midvein at base to 2 mm above the leaf base, the conspicuous secondary veins placed 2–7.5 mm in from margin, the inconspicuous secondary veins intramarginal to 1.5 mm in from margin, tertiary veins percurrent, oriented subperpendicular to midvein, 1.5–7 mm apart, connected by 1 or 2 quaternary veins, or quaternary veins reticulate, not connecting tertiary veins, the higher order veins reticulate, the midvein and major secondary veins slightly to moderately impressed, tertiary veins slightly impressed to flat, remaining veins slightly impressed to flat on adaxial surface; the midvein strongly raised, the major secondary veins strongly to moderately raised, the minor secondary veins and tertiary veins slightly raised, and the higher order veins slightly raised to flat on abaxial surface; adaxial surface appearing slightly wrinkled after drying, with scattered druse crystals, and drying darker than the abaxial surface, the indumentum initially of dense, brunnescent to ferruginous, globular-stellate hairs, but quickly glabrescent, although some hairs persisting proximally on midvein and major secondary veins; abaxial surface pale green but appearing brunnescent to ferruginous due to indumentum, the epidermal surface ± smooth, with dense, brunnescent to ferruginous, globular-stellate hairs (with arms pointing upward to radiating outward), 0.16–0.28 mm across, the veins with similar hairs, such hairs on lamina and veins persistent, mite domatia absent. **Inflorescences** terminal, paniculate cymes, 3–5 cm long, 2–4 cm across, with 1–3 major branch pairs, the peduncle 1.5–3.3 cm long, the ultimate axes (pseudopedicels) 2–7 mm long, and numerous flowers well separated from each other; bracts not seen, presumably triangular, very quickly deciduous; bracteoles not seen, presumably ± triangular, deciduous. **Flowers** 5-merous, zygomorphic (due to positioning of the stamens), with pedicel 1–2 mm long. Hypanthium 6.5–8 mm long, terete and slightly to distinctly constricted above ovary, the free portion 2.5–4 mm long, 2.3–3 mm wide at the torus, the outer surface with moderate to dense globular-stellate hairs, the internal surface very slightly longitudinally ridged, glabrous. **Calyx** lobes 5, separate in bud, the tube 0.9–2 mm long at late anthesis (only old flowers seen), not tearing between the lobes, with moderate to dense globular-stellate hairs adaxially and abaxially, the lobes 1.7–3.5 × 1–3.5 mm, ± triangular, the apex acute to rounded, with hairs similar to those of the tube, green, often red-tinged; calyx teeth present, 0.2–1 mm long, merely a ridge along lobe to a ridge with short apical bulge or projection, green or reddish, with rounded apex, and hairs similar to those of calyx. **Petals** 5, 6–7.5 × 5–6 mm, asymmetrically obovate, spreading, white, glabrous but both surfaces densely papillose-granulate, the apex rounded, the base slightly narrowed to a broad attachment, the margin entire. **Stamens** 10, not seen. **Ovary** 3-locular, 2/3–4/5 inferior, apically conical, glabrous, the apex with a small, slightly ridged collar but lacking a crown, with axile placentation, the ovules numerous, borne on a small placenta not extending or only slightly extending into locule; style not seen. Berries 6–8 mm long, 5–6 mm in diameter, ellipsoid, purple-black, with sparse to moderate globular-stellate hairs, the hypanthium strongly constricted, 2–2.5 mm wide at narrowest point and 3–3.5 mm wide at torus. **Seeds** 1.7–2 mm long, angular-obovoid, with ± rectangular hilum, the testa ± smooth; appendage absent.

Phenology.—Only collected in flower in August.

Distribution and habitat.—*Miconia cristalensis* is endemic to the Sierra de Cristal (Prov. Santiago de Cuba), Cuba (Fig. 7), occurring from 630–800 m in pine forests and thickets on serpentine or gabbro.

Additional specimens examined: **CUBA. Prov. Santiago de Cuba**: Sierra de Cristal, Mpio. Segundo Frente, ladera SE del Pico Cristal, subida al firme desde la intersección del camino del Oro a Batista y La Zanja, 700 m, 26 Apr 2004, *Bécquer* HFC-82262 (FLAS, HAJB); Segundo Frente, Sierra Cristal, camino de San Nicolás al Oro, cerca del cruce del río Miguel, 3 Nov 2005, *Bécquer et al.* HFC-83729 (HAJB); Mayarí Arriba, Sierra de Micara, 800 m, Jun 1967, *Bisse & Rojas* HFC-4233 (HAJB).

Miconia cristalensis is very poorly collected, but apparently is most closely related to *M. maestrensis* (see key for differentiating characters) and *M. barbata*, from which it differs in the lack of mite domatia and in its longer

calyx lobes. The three species are likely reproductively isolated, as *M. maestrensis* occurs only in the Sierra Maestra and *M. barbata* in the Sierra de Nipe and other areas in northern "Oriente" (Fig. 7); however both *M. maestrensis* and *M. barbata* likely co-occur with the widespread *M. bicolor*. They are at least broadly sympatric geographically, and more fieldwork is needed to investigate subtle ecological differences.

9. *Miconia maestrensis* Judd, Bécquer, & Majure, nom. nov. (Fig. 6D). *Miconiastrum lambertianum* Bonpl. ex Naudin, Ann. Sci. Nat., Bot., ser. 3. 15:341, t. 17. 1850, non *Miconia lambertiana* DC., Prodr. 3:185. 1928. TYPE: CUBA [PROV. SANTIAGO DE CUBA]: St. Jago de Cuba, Nima-nima, Aug 1844, Linden 2081 (LECTOTYPE, chosen by Martin & Cremers, J. Bot. Soc. Bot. France 37:40. 2007, P on-line image #481686!; ISOLECTOTYPE, NY, 2 sheets!, P on-line image #481687!).

Evergreen **shrub or tree** to 5 m. Young **stems** terete to slightly quadrangular, the indumentum of dense, ferruginous, globular-stellate to dendritic hairs, without elongate, multicellular, non-glandular hairs, eventually \pm glabrescent, internodes 0.7–10.8 cm long, lacking longitudinal ridges, nodal line present, faint. **Leaves** isophyllous or nearly so; petiole 1.8–3 cm long, the indumentum of dense, ferruginous, globular-stellate to stellate hairs; the blade 4.7–15.5 \times 1.8–5.6 cm, ovate to elliptic, not falcate to slightly so, \pm coriaceous, the apex acuminate to attenuate, the base acute to obtuse or rounded, the margin plane to slightly revolute, entire; secondary veins 2 pairs, one pair conspicuous and one pair inconspicuous, acrodromous, basal, the innermost pair joining midvein at base to 3 mm above the leaf base, the conspicuous secondary veins placed 3–8 mm in from margin, the inconspicuous secondary veins intramarginal to 1.3 mm in from margin, tertiary veins percurrent, oriented subperpendicular to midvein, 1.7–10 mm apart, connected by 1 or 2 quaternary veins, or not connected by such veins, and quaternary veins \pm reticulate, the higher order veins reticulate, the midvein and major secondary veins slightly impressed to flat, tertiary veins very slightly impressed to flat, remaining veins flat on adaxial surface; the midvein strongly raised, the major secondary veins moderately to slightly raised, the minor secondary veins and tertiary veins flat to very slightly raised, and the higher order veins flat on abaxial surface; adaxial surface appearing slightly wrinkled after drying, with scattered druse crystals, and drying darker than the abaxial surface, the indumentum initially of \pm dense, stellate hairs, but very quickly glabrescent, although a few hairs often persisting on proximal portion of midvein and major secondary veins; abaxial surface pale green, but appearing ferruginous to pale ferruginous due to dense indumentum, the epidermal surface \pm smooth, with dense, ferruginous to pale ferruginous, stellate hairs (with arms pointing upward to radiating outward), 0.13–0.24 mm across, the veins with similar hairs, such hairs on lamina and veins persistent; mite domatia absent. **Inflorescences** terminal, paniculate cymes, 3.5–13 cm long, 2.5–6 cm across, with 1–4 major branch pairs, the peduncle 0.8–4 cm long, the ultimate axes (pseudopedicels) 1.5–5.5 mm long, and the numerous flowers well separated from each other; bracts not seen, but presumably triangular, very quickly deciduous; bracteoles ca. 0.4 \times ca. 0.15 mm, narrowly triangular, with acute apex, deciduous. **Flowers** 5-merous, zygomorphic (due to positioning of the stamens), with pedicel 1–3 mm long. Hypanthium 6–6.5 mm long, terete and slightly constricted above ovary, the free portion 2.4–2.8 mm long, 2–2.5 mm wide at the torus, the outer surface with dense stellate hairs, the internal surface smooth to very slightly longitudinally ridged, glabrous. **Calyx** lobes 5, separate in bud, the tube 0.7–1 mm long, not tearing between lobes, with \pm dense stellate hairs adaxially, and dense to moderate branched to stellate hairs adaxially, the lobes 0.3–0.6 \times 2.5–3 mm, broadly triangular, the apex obtuse to rounded, with hairs similar to those of the tube, green to red-tinged; calyx teeth present, 0.1 mm long, merely a small bump near apex of lobe, green, with rounded apex, and hairs similar to those of calyx. **Petals** 5, 6.3–7 \times 3.4–5 mm, asymmetrically obovate, spreading, white, glabrous but both surfaces densely papillose-granulate, the apex rounded, the base slightly narrowed to a broad attachment, the margin entire. **Stamens** 10, isomorphic, \pm geniculate near filament apex; staminal filament 5.5–7 mm long, glabrous, color unknown, anther thecae 4.8–6 \times 0.7–1 mm, subulate, straight to slightly incurved, opening by a small dorso-apical pore, yellow, the connective not prolonged below the thecae, glabrous, but the filament emerging from slight depression in sterile, minutely dorso-lobed anther base. **Ovary** 3-locular, 2/3–4/5 inferior, apically conical, glabrous, the apex with a small, slightly ridged collar but lacking a crown, with axile placentation, the ovules numerous, borne on a small placenta not or only slightly extending locule; style 12–16 mm long, distally curved, white, glabrous; stigma punctate, minutely papillose, 0.15–0.2 mm wide. **Berries**

[nearly mature] 5.5–10 mm long, 4.5–6 mm in diameter, globose to ellipsoid, green [but presumably turning purple-black], with scattered to moderate, stellate hairs, the hypanthium strongly constricted, 1.5–2.3 mm wide at narrowest point and 2.3–2.7 mm wide at torus, but appearing wider due to flaring calyx tube. **Seeds** 1.5–2 mm long, angular-obovoid, with \pm rectangular hilum, the testa \pm smooth; appendage absent.

Phenology.—Only known to flower in August, but very poorly collected, and surely with a broad flowering period, as mature fruits have also been collected in August.

Distribution and habitat.—*Miconia maestrensis* occurs in Cuba, in the Sierra Maestra and associated lower elevation habitats, in southern “Oriente” (Prov. Granma, and Santiago de Cuba), in moist forests, on limestone, near rivers or arroyos, at low elevations to 935 m (Fig. 7).

Additional specimens examined: **CUBA. Prov. Granma:** Sierra Maestra, Mun. Buey Arriba, Barrio Nuevo a Pata la Mesa, cerca 4 km al SE de El Manguito, 13 May 1988, *Alvarez de Zayas et al. HFC-64310* (B, HAJB); Buey Arriba, Guamá, Barrio Nuevo a Peladero, 24 May 1988, *Alvarez de Zayas et al. HFC-65244* (HAJB); Sierra Maestra, Río Yara, 6 Jul 1922, *Ekman 14188* (S); Sierra Maestra, on the edge of Arroyo Corrojo, near Nagua, 20 Aug 1922, *Ekman 14920* (GH, S); Península de Cabo Cruz, between Río Nuevo and the coast, 16 Jan 1923, *Ekman 16150* (GH, HAC, S); Bartolome Masó, Parque Nacional Turquino, sendero Alto del Naranjo-Pico Turquino, entre Alto del Naranjo y La Platica, 20°0'53"N, 76°53'44.5"W, 935 m, 8 Nov 2013, *Michelangeli et al. 2209* (HAJB, NY). **Prov. Santiago de Cuba:** St. Jago de Cuba, Nima-nima, 1834–1844, *Linden 2091* (NY, P on-line image).

Miconia maestrensis, although early described, has long been known as either *Tetrazygia pallens* (see Cogniaux 1891) or *T. bicolor* (e.g., identifications on specimens such as *Ekman 14188* or *Ekman 14920*). This species is distinguished from *T. bicolor* by its indumentum of stellate hairs (not stellate-peltate scales, see key), and is phenetically most similar to *M. cristalensis*. It differs from *M. cristalensis* by the characters indicated in the key (note especially its much shorter calyx lobes). *Miconia maestrensis* is easily distinguished from *M. barbata* by the lack of mite domatia. It appears to be reproductively isolated from both *M. cristalensis* and *M. barbata*, since they occur in northern “Oriente” (Fig. 7). *Miconia maestrensis* has been very poorly collected, and additional collections would improve our understanding of its pattern of variation and geographical distribution. The specimen *Alvarez de Zayas et al. HFC 64310* is tentatively considered to represent this species; only a photo has been seen by the first author, and it appears to be more densely pubescent than other material examined. Perhaps the variation exhibited among the specimens here considered within *M. maestrensis* actually represents that of more than one species, but a broad circumscription is here advocated due to the current paucity of herbarium material.

An epithet is unavailable in *Miconia* since *Miconiastrum lambertianum* cannot be transferred. We have therefore chosen the new name *Miconia maestrensis*, highlighting the distinctive geographical range of this species.

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